
COURSE:

ACADEMIC YEAR: 2017-2018

TYPE OF EDUCATIONAL ACTIVITY: Affine

TEACHER: Dr. Sergio Brutti

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phone: 0971 205455

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Language: ITALIAN

ECTS:5 (6 lessons)

n. of hours: 48 hours of lessons

Campus: Potenza
Dept./School: DIS
Program: Chemical sciences LM-54

Semester: II semester

EDUCATIONAL GOALS AND EXPECTED LEARNING OUTCOMES

○ Basic knowledge about the structure and thermodynamics of solids. Basic and advanced knowledge of the technological devices and related processes for the electrochemical storage and conversion of energy: secondary galvanic cells, lithium-ion cells, fuel cells. Knowledge of the most important inorganic, organic or polymeric compounds used as functional materials in the abovementioned technological devices.

PRE-REQUIREMENTS

No prerequisite besides a bachelor degree in chemistry L-27

SYLLABUS

- (1) Crystal structure of materials; diffraction techniques for the investigation of the materials structure
- (2) Thermodynamics of solids, solid solutions and transformations in the solid state and solidi/gas biphasic equilibrium
- (3) Thermodynamics and kinetics in redox systems. Primary and secondary galvanic cells; lithium systems: basic structure of a Commercial Li-ion cell. Solid state electrochemistry: intercalation, alloying, conversion. Cathode and anode materials. Liquid non-aqueous electrolytes: salts and solvents. Polymeric electrolytes, solid state electrolytes. Electrochemical methods for the Characterization of galvanic cells. Advanced methods for the characterization of Galvanic processes.

TEACHING METHODS

The class learning activities are organized in 48h of standard class teaching using the online material provided by the teacher

EVALUATION METHODS

During the semester 4 intermediate exams (esoneri) will be organized. Those students able to pass 3 over 4 esoneri with an average mark >18 will be able to complete the exam in an oral colloquium. Those students unable to pass at least 3/4 esoneri with an average mark >18 will be asked to complete the exam by carrying out a written and an oral exam.

TEXTBOOKS AND ON-LINE EDUCATIONAL MATERIAL

- BB Bokstein, MI Mendeleev, DJ Srolovitz. Thermodynamic and kinetics in materials science
- Online slides downloadable at the webiste www2.unibas.it/sbrutti

INTERACTION WITH STUDENTS

The teacher is open for discussion and additional teaching during the planned weekly colloquia (thuesday 9-11), by email (sergio.brutti@unibas.it) or by phone (0971 205455).

EXAMINATION SESSIONS (FORECAST)¹

February (2 days); June; July, September; October

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.