UNIVERSITÀ DI PAVIA

Anno Accademico 2015/2016

PHYSICAL CHEMISTRY III

Enrollment year	2014/2015
Academic year	2015/2016
Regulations	DM270
Academic discipline	CHIM/02 (PHYSICAL CHEMISTRY)
Department	DEPARTMENT OF PHYSICS
Course	
Curriculum	FISICA DELLA MATERIA
Year of study	2°
Period	2nd semester (01/03/2016 - 15/06/2016)
ECTS	6
Lesson hours	48 lesson hours
Language	ITALIAN
Activity type	ORAL TEST
Teacher	MASSAROTTI VINCENZO (titolare) - 6 ECTS
Prerequisites	Basic knowledge of Physical Chemistry and Physics.
Learning outcomes	Lead the student habitual use of prior knowledge of Physical Chemistry to facilitate links with the new concepts to be developed in the program. The student will also become familiar with the acquisition of a new language appropriate to the understanding of the proposed topics. The ability to handle chemical and physical concepts and new terminology will be evaluated in joint discussions of examples and exercises proposed during the course.
Course contents	The course is devoted to the basic aspects of solid state physical chemistry and includes lectures on theory and application examples on the following topics. Structure and Bonding in crystals, diffraction effects of a structure, phonons and lattice vibrations; Electronic properties of solids: free electrons and heat capacity of the electrons, quasi-free electrons and energy bands, patterns of reduced zone and extended

	zone, solutions to the zone boundary and number of states in a energy band; Comparison of properties in metals, insulators, semiconductors; Intrinsic conductivity and forbidden energy range; Electrons and holes, charge carriers and extrinsic conductivity (impurities): carriers mobility, lifetime and recombination mechanisms; p-n junctions, rectifier properties of the junctions with some applications; Equilibrium point defects in stoichiometric and non-stoichiometric compounds and defects-property relations: electrical conductivity and diffusivity in solids. Heterogeneous kinetics, volume defects, phase nucleation, interface phenomena and threshold displacement interface mechanisms. Geometric models for studies of kinetics and mechanisms of reaction s in the solid state.
Teaching methods	Lectures of theory and application examples. Solution and discussion of numerical exercises.
Reccomended or required readings	Charles Kittel, “Introduction to Solid State Physics” – 8. Ed. –Hoboken, NJ: John Wiley & Sons, 2005; A.R. West, “Solid State Chemistry and its applications”, 2nd Ed, 2014.
Assessment methods	Oral
Further information	
Sustainable development goals - Agenda 2030	$lbl_legenda_sviluppo_sostenibile