



COURSE: Materials and Technologies for the Environment			
ACADEMIC YEAR: 2016-2017			
TYPE OF EDUCATIONAL ACTIVITY: (Basic, Characterizing, Affine, Free choice, Other)			
TEACHER: Antonio Telesca			
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phone: +390971205225		mobile (optional):	
Language: Italiano			
ECTS: 6	n. of hours: 60	Campus: Potenza School of Engineering Program: Civil and Environmental Engineering	Semester: II

EDUCATIONAL GOALS AND EXPECTED LEARNING OUTCOMES
Relationships among composition, microstructure and properties of metals, polymers and ceramics. Critical knowledge of materials and substances mainly related to the Environmental Engineering Field. Knowledge of the main physico-chemical water treatment techniques. Solid, liquid and gaseous fuels. Biomasses.

PRE-REQUIREMENTS
Basic concepts of Chemistry

SYLLABUS
Cycle, classification and obtainment and choice of materials. The structure of crystalline solids: unit cells. Metallic crystal structures. Point coordinates, crystallographic directions, crystallographic planes, linear and planar densities, close-packed crystal structures. polymorphism and allotropy. Imperfections in Solids: Vacancies and Self-Interstitials, impurities in solids, specification of composition, dislocations–linear defects, interfacial defects, bulk or volume defects, atomic vibrations. Mechanical properties of metals. Failure: fracture, fatigue and creep. Phase diagrams. solubility limit, phases, microstructure, phase equilibria, one-component phase, diagrams. binary isomorphous systems, interpretation of phase diagrams, development of microstructure in isomorphous alloys, mechanical properties of isomorphous, alloys, binary eutectic systems, development of microstructure in eutectic alloys, equilibrium diagrams, eutectic and peritectic reactions, congruent phase transformations, the Gibbs phase rule. The iron–iron carbide (Fe–Fe₃C) phase diagram, development of microstructure in iron–carbon alloys. The influence of other alloying elements. Applications and processing of metal alloys. TTT and CCT Diagrams. Iron based materials. Cast iron production process. Cast iron and steel classification. Water classification and analysis. Main chemical-physical water treatments. Solid, liquid and gaseous fuels. Biomasses.

TEACHING METHODS
Theoretical lessons, Classroom tutorials.

EVALUATION METHODS
Written examination.

TEXTBOOKS AND ON-LINE EDUCATIONAL MATERIAL

- Notes from lectures
- J.M. Shackelford – Introduction to Materials Science for Engineers – Prentice Hall I.E.
- W. F. Smith – Scienza e Tecnologia dei materiali, McGraw Hill Italia.
- C. Brisi – Lezioni di Chimica Applicata, Editrice Universitaria Levrotto & Bella, Torino.
- AIMAT – Manuale dei materiali per l'ingegneria, McGraw Hill Italia

INTERACTION WITH STUDENTS
Wednesday 3-5 pm. Other appointments can be arranged with students by e-mail



Università degli Studi della Basilicata
Scuola di Ingegneria

EXAMINATION SESSIONS (FORECAST)¹

15/02/2017; 22/03/2017; 26/04/2017; 24/05/2017; 28/06/2017; 24/07/2017; 18/09/2017; 18/10/2017;
29/11/2017; 13/12/2017

SEMINARS BY EXTERNAL EXPERTS YES X NO

FURTHER INFORMATION

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