UNIVERSITÀ DEGLI STUDI DI PALERMO

DEPARTMENT	Ingegneria
ACADEMIC YEAR	2017/2018
BACHELOR'S DEGREE (BSC)	MECHANICAL ENGINEERING
SUBJECT	GENERAL TECHNOLOGIES OF MATERIALS
TYPE OF EDUCATIONAL ACTIVITY	B
AMBIT	50302-Ingegneria meccanica
CODE	07353
SCIENTIFIC SECTOR(S)	ING-IND/16
HEAD PROFESSOR(S)	BARCELLONA ANTONIO Professore Associato Univ. di PALERMO
OTHER PROFESSOR(S)	
CREDITS	6
INDIVIDUAL STUDY (Hrs)	96
COURSE ACTIVITY (Hrs)	54
PROPAEDEUTICAL SUBJECTS	
MUTUALIZATION	
YEAR	2
TERM (SEMESTER)	2° semester
ATTENDANCE	Not mandatory
EVALUATION	Out of 30
TEACHER OFFICE HOURS	**BARCELLONA ANTONIO** Monday 8:00 10:00 Stanza docente Tuesday 8:00 10:00 Stanza docente Wednesday 8:00 10:00 Stanza docente Thursday 8:00 10:00 Stanza docente

DOCENTE: Prof. ANTONIO BARCELLONA

PREREQUISITES	Basic knowledge of Mathematical, Chemical and Physical Analysis are required.
LEARNING OUTCOMES	Knowledge and understanding: The student of General Materials Technology will develop a definite and consolidated knowledge of the principles of characterization and analysis of materials used in industry; In particular he will develop an in-depth knowledge of the mechanical and technological properties of steels, cast iron and non-ferrous alloys of copper and aluminum. Ability to apply knowledge and understanding: With reference to the ability of engineering analysis, the student of general materials technologies will be able to apply his knowledge for the understanding, identification and resolution of typical industrial issues regarding the choice and applicability of the materials, and the characterization of materials for industrial uses. Judgment autonomy: The student of general materials technology is able to identify the sources of data needed for analysis, understanding of problems, and designing system components. He is capable of doing bibliographic research, analyzing relevant sources and interpreting them. Communication skills: Thanks to the mastery of knowledge and the awareness of their tools, the student of general materials technology is able to present the information in his possession, to expose the problems and to communicate the solutions proposed professionally within professional contexts and not; he is also able to work effectively as a component of a workgroup in the selection and selection of materials. Learning capacity: The student of general materials technologies in the context of "continuous learning" develops learning skills that will allow him to keep himself updated, but also to continue his studies at a higher level of knowledge and greater responsibility with greater Autonomy and awareness. In addition, the student will learn to apply to the subsequent studies the "engineering approach", that is the ability to analyze and shape problems related to the choice of materials in order to provide concrete solutions.
ASSESSMENT METHODS	The final test consists of a written test with more than one open response, to verify the knowledge of the most appropriate materials selection methods in their respective fields of use. For this purpose, the student must demonstrated to know the state diagrams, the relative crystalline phases, the ways of obtaining the mechanical characteristics (fracture limits, hardness, collapse, fatigue limits, hardenability, coding of metallic alloys and modalities to realize, on the basis of Bain's experiment, the main thermal treatments, also through metallographic analysis.The final evaluation is thirty-one, each question has the same weight, 18/30 conferred when the knowledge is elementary and 30 / 30 cum Lode when the knowledge shown is excellent.In detail: Excellent (Excellent knowledge of subjects, excellent language property, excellent analytic capacity) 30 cum Lode. Very good (good mastery of the arguments, full language skills, the student is able to apply knowledge to solve the proposed problems) 26-29. Good (basic knowledge of the main arguments, discrete language property, with limited ability to apply knowledge to the solution of the proposed problems) 24-25. Satisfactory (the student has full command of the main subjects of the teaching but he possesses basic knowledge, satisfactory language property, poor ability to apply the acquired knowledge independently) 21-23. Sufficient (minimum basic knowledge of the main subjects of the teaching and technical language, low ability to independently apply the acquired knowledge, he does not have an acceptable knowledge of the content of the subjects covered in the teaching) 18-21.
EDUCATIONAL OBJECTIVES	The student of General Materials Technology will develop a definite and consolidated knowledge of the principles of characterization and analysis of materials used in the industry, with the ability to choose the appropriate material according to the application.
TEACHING METHODS	Lectures, seminars held by industry experts, numerical exercises and laboratory activities.
SUGGESTED BIBLIOGRAPHY	A. Barcellona "Tecnologie Generali dei Materiali" III edizione – progetto editoriale EVenus

SYLLABUS

Hrs	Frontal teaching
4	Elementar cells, fusion and solidification.
4	Equilibrium diagrams, miscibility, lever rule
6	FeC state diagram.
4	Status diagrams of alloyed steels.
6	Steels, cast iron, light alloys, special alloys: classification and coding.

SYLLABUS

Hrs	Frontal teaching
4	Thermal treatment of steels and other metal alloys.
4	Classification, coding and thermal treatments of non-ferrous alloys.
2	Plastic materials.
6	Metallographic analysis
8	Mechanical and technological characterization tests (traction, hardness, resilience, fatigue, hardening, collapse, bend).

Hrs	Practice
6	Numerical exercises on Traction, Hardness, Resilience, and Steel Thermal Treatments.

Hrs	Workshops
6	Laboratory tests on Traction, Hardness, Resilience and Steel Thermal Treatments.