

POLITEHNICA University of Bucharest (**UPB**)
 Faculty of Industrial Engineering and Robotics (**FIIR**)
 Study Programme: Industrial Engineering (**IE**)
 Form of study: License (Bachelor)

COURSE SPECIFICATION

Course title:	Materials Science	Semester:	2
Course code:	UPB.06.D.02.O.004	Credits (ECTS):	5

Course structure	Lecture	Seminar	Laboratory	Project	Total hours
<i>Number of hours per week</i>	2	-	2	-	4
<i>Number of hours per semester</i>	28	-	28	-	56

Lecturer	Lecture	Seminar / Laboratory / Project
<i>Name, academic degree</i>	Brandusa Ghiban, professor	Brandusa Ghiban, professor
<i>Contact (email, location)</i>	ghibanbrandusa@yahoo.com	ghibanbrandusa@yahoo.com

Course description:
<p>During the acquisition by the student with the newest techniques for the assessment and use of the materials on the basis their characterization more complex, and for this receiving knowledge about crystalline structure, structural defects, the phase transformations in the solid state (by kinetic study, termodinamic, morphology of the mechanism and of transformations) as the basis of heat and thermo-chemical treatment. The main structural transformations in solid state will be study: eutectoid transforma-tion, mastensitic transformation, bainitic transformation. Also main heat and chemical treatments will be analysed: annealing (parameters and classification), quenching (parameters and classification), diffusion and its laws, classification and parameters of chemical heat treatments, Determining skills to students to carry out the correlation between structure-property- processing of materials in order to ensure the highest performance. Discipline's contribution to the line of competence of specialisation is 100 %.</p>
Seminar / Laboratory / Project description:
<ul style="list-style-type: none"> - development of the capacity of students to develop, validate and apply to specific methodologies for the preparation of the analysis report and expertizare the structural characteristics of the materials investigated - knowledge concenig the critical points of the metallic materials by thermal analysis; - knowledge concerning the preparation of the metallographic samples; - knowledge concerning phases and constituents of the metallic materials; - knowledge of macrostructure and microstructure for various classes of metallic materials (common steel, stainless steels, cast irons, aluminum base alloys, copper, nickel, titanium); - detection of faults in the structure and the interpretation of the results concerning the structural aspects after carrying out different chemical treatments and/or heat treatments.
Intended learning outcomes:

Fundamental knowledge in the field of the science of modern materials. Powers in theoretical knowledge and practical experience relating to the structure and properties of metallic materials. Necessary knowledge future project of diploma. Basic knowledge of the future engineer specializing in construction of machines in the field of materials science.

Assessment method:	% of the final grade	Minimal requirements for award of credits
Written exam	20%	
Report / project		
Homework	20%	
Laboratory	40%	
Other	20%	

References:

1. Donald Askeland- Materials Science and Engineering C, ISSN: 0928-4931
2. Callister William Jr, David G. Rethwisch- Callister's Materials Science and Engineering, Tenth Edition, Wiley
3. Ghiban, B., G. Coşmeleaţă - "Transformations, Structure and Properties of Materials", Editura Printech, 2002, ISBN 973-652-692-5, (358 pages)
4. G. Coşmeleaţă, Ghiban B., - "Fundamental Principles of Physical Metallurgy", Editura Printech, 2000, ISBN 973-652-281-4, (246 pages)

Prerequisites:

Chemistry, Physics, Mathematics

Co-requisites

(courses to be taken in parallel as a condition for enrolment):

It is not the case

Additional relevant information:

Date: 01.08.2022

Professor habil.dr.eng. Brandusa Ghiban