

SYLLABUS ¹

1. Information about the program

1.1 Higher education institution	Politehnica University Timisoara
1.2 Faculty ² / Department ³	Civil Engineering/ Materials and Manufacturing Engineering
1.3 Chair	—
1.4 Field of study (name/code ⁴)	Civil Engineering/8
1.5 Study cycle	bachelor
1.6 Study program (name/code/qualification)	Civil Engineering (in English)/10/Engineer

2. Information about the discipline

2.1 Name of discipline/ formative category ⁵	Material Science 1 / Domain Discipline (DD)						
2.2 Coordinator (holder) of course activities	Nicoară Mircea						
2.3 Coordinator (holder) of applied activities ⁶	Buzdugan Dragoş						
2.4 Year of study ⁷	I	2.5 Semester	2	2.6 Type of evaluation	E	2.7 Type of discipline ⁸	DI

3. Total estimated time – hours / semester: direct teaching activities (fully assisted or partly assisted) and individual training activities (unassisted) ⁹

3.1 Number of fully assisted hours / week	4 of which:	3.2 course	2	3.3 seminar / laboratory / project	2
3.1* Total number of fully assisted hours / semester	56 of which:	3.2* course	28	3.3* seminar / laboratory / project	28
3.4 Number of hours partially assisted / week	of which:	3.5 training		3.6 hours for diploma project elaboration	
3.4* Total number of hours partially assisted / semester	of which:	3.5* training		3.6* hours for diploma project elaboration	
3.7 Number of hours of unassisted activities / week	2 of which:	additional documentary hours in the library, on the specialized electronic platforms and on the field			0,5
		hours of individual study after manual, course support, bibliography and notes			0,5
		training seminars / laboratories, homework and papers, portfolios and essays			1
3.7* Number of hours of unassisted activities / semester	28 of which:	additional documentary hours in the library, on the specialized electronic platforms and on the field			7
		hours of individual study after manual, course support, bibliography and notes			7
		training seminars / laboratories, homework and papers, portfolios and essays			14
3.8 Total hours / week ¹⁰	6				
3.8* Total hours /semester	84				
3.9 Number of credits	4				

4. Prerequisites (where applicable)

4.1 Curriculum	•
4.2 Competencies	•

¹ The form corresponds to the Discipline File promoted by OMECTS 5703 / 18.12.2011 and to the requirements of the ARACIS Specific Standards valid from 01.10.2017.

² The name of the faculty which manages the educational curriculum to which the discipline belongs

³ The name of the department entrusted with the discipline, and to which the course coordinator/holder belongs.

⁴ The code provided in HG no.140 / 16.03.2017 or similar HGs updated annually shall be entered.

⁵ Discipline falls under the educational curriculum in one of the following formative disciplines: Basic Discipline (DF), Domain Discipline (DD), Specialist Discipline (DS) or Complementary Discipline (DC).

⁶ Application activities refer to: seminar (S) / laboratory (L) / project (P) / practice/training (Pr).

⁷ Year of studies in which the discipline is provided in the curriculum.

⁸ Discipline may have one of the following regimes: imposed discipline (DI), optional discipline (DO) or optional discipline (Df).

⁹ The number of hours in the headings 3.1 *, 3.2 *, ..., 3.8 * is obtained by multiplying by 14 (weeks) the number of hours in headings 3.1, 3.2, ..., 3.8. The information in sections 3.1, 3.4 and 3.7 is the verification keys used by ARACIS as: (3.1) + (3.4) ≥ 28 hours / wk. and (3.8) ≤ 40 hours / wk.

¹⁰ The total number of hours / week is obtained by summing up the number of hours in points 3.1, 3.4 and 3.7.

5. Conditions (where applicable)

5.1 of the course	•
5.2 to conduct practical activities	•

6. Specific competencies acquired through this discipline

Specific competencies	<ul style="list-style-type: none"> Learn specific terminology, structure, properties and main applications of engineering materials
Professional competencies ascribed to the specific competencies	<ul style="list-style-type: none"> Recognizing typical structures and structural elements, specific to the graduated study programme Design of structural elements in civil engineering, specific to graduated study programme Complying to quality and sustainable requirements for civil, industrial and agricultural constructions
Transversal competencies ascribed to the specific competencies	<ul style="list-style-type: none"> Documentation in Romanian and foreign language, in view of professional and personal development, via continuous learning and efficient adaptation to the new technical specifications

7. Objectives of the discipline (based on the grid of specific competencies acquired - pct.6)

7.1 The general objective of the discipline	<ul style="list-style-type: none"> To accommodate the students with specific terminology, structure, properties and main applications of engineering materials
7.2 Specific objectives	<ul style="list-style-type: none"> To know the general properties of different classes of engineering materials To understand correlation between composition – structure – properties of metallic materials To know the general principles for the selection of engineering materials, with emphasis on metallic alloys To understand the main principles of heat treatments To get familiar with some laboratory equipment specific to the domain

8. Content¹¹

8.1 Course	Number of hours	Teaching methods ¹²
Overview of engineering materials: main categories and properties	1	Interactive lecture using PowerPoint, films, electronic resources on internet
Ferrous alloys: steel and cast iron	3	
Aluminum and its alloys	2	
Copper and its alloys	2	

¹¹ It details all the didactic activities foreseen in the curriculum (lectures and seminar themes, the list of laboratory works, the content of the stages of project preparation, the theme of each practice stage). The titles of the laboratory work carried out on the stands shall be accompanied by the notation "(*)".

¹² Presentation of the teaching methods will include the use of new technologies (e-mail, personalized web page, electronic resources etc.).

Bibliography¹³
1. William D. Callister Jr., David G. Rethwisch - Fundamentals of Materials Science and Engineering: An Integrated Approach 4th Edition, 2012
2. Michael F. Ashby, David R. H. Jones Engineering Materials 1: An Introduction to their Properties and Applications, 2nd Edition, 2002
3. L.R. Cucuruz, M. Nicoara, B. Radu, A. Raduta - Aliaje neferoase. Aluminiul și aliajele sale, Editura Politehnica, Timisoara, 2010, ISBN 978-606-554-221-1

8.2 Applied activities ¹⁴	Number of hours	Teaching methods
Optical and electron microscopy		Interactive
Tensile and hardness testing of metals		
Fe-Fe ₃ C phase diagram		
Heat treatments		

Bibliography¹⁵
1. William D. Callister Jr., David G. Rethwisch - Fundamentals of Materials Science and Engineering: An Integrated Approach 4th Edition, 2012
2. Michael F. Ashby, David R. H. Jones Engineering Materials 1: An Introduction to their Properties and Applications, 2nd Edition, 2002

9. Corroboration of the content of the discipline with the expectations of the main representatives of the epistemic community, professional associations and employers in the field afferent to the program

- Employers may expect that civil engineers have basic knowledge about main classes of engineering materials, regarding their general properties, processing methods, main applications
- Practical knowledge about materials testing and microstructural characterization are highly appreciated in companies with solid quality systems
- Syllabus has been adapted to the main characteristics of companies that are active in industrial production, design, service and maintenance
- The structure of knowledge that is transmitted by the discipline allows engineers to easily adapt to changes and improvements of current engineering materials and their processing methods

10. Evaluation

Type of activity	10.1 Evaluation criteria ¹⁶	10.2 Evaluation methods	10.3 Share of the final grade
10.4 Course	Knowing and understanding of basic notions	Written final exam based on questionnaire	
10.5 Applied activities	S:		
	L: Operation of experimental procedure on the laboratory equipment and interpretation of results	Evaluation on each laboratory session	
	P ¹⁷ :		
	Pr:		
10.6 Minimum performance standard (minimum amount of knowledge necessary to pass the discipline and the way in which this knowledge			

¹³ At least one title must belong to the discipline team and at least one title should refer to a reference work for discipline, national and international circulation, existing in the UPT library.

¹⁴ Types of application activities are those specified in footnote 5. If the discipline contains several types of applicative activities then they are sequentially in the lines of the table below. The type of activity will be in a distinct line as: "Seminar:", "Laboratory:", "Project:" and / or "Practice/training".

¹⁵ At least one title must belong to the discipline team.

¹⁶ Syllabus must contain the procedure for assessing the discipline, specifying the criteria, methods and forms of assessment, as well as specifying the weightings assigned to them in the final grade. The evaluation criteria shall be formulated separately for each activity foreseen in the curriculum (course, seminar, laboratory, project). They will also refer to the forms of verification (homework, papers, etc.)

¹⁷ In the case where the project is not a distinct discipline, this section also specifies how the outcome of the project evaluation makes the admission of the student conditional on the final assessment within the discipline.

is verified ¹⁸⁾

- Answering at last 40% of questions of the exam questionnaire
- Completion of all applied activities

Date of completion

29 January 2018

**Head of Department
(signature)**

.....

**Course coordinator
(signature)**

**Date of approval in the Faculty
Council ¹⁹**

12.02.2018

**Coordinator of applied activities
(signature)**

.....

**Dean
(signature)**

.....

¹⁸ It will not explain how the promotion mark is awarded.

¹⁹ The endorsement is preceded by the discussion of the board's view of the study program on the discipline record.