

SYLLABUS ¹

1. Information about the program

1.1 Higher education institution	Politehnica University Timisoara
1.2 Faculty ² / Department ³	Civil Engineering / CCI
1.3 Chair	—
1.4 Field of study (name/code ⁴)	Civil Engineering / 80
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 I						
2.2 Coordinator (holder) of course activities	Sl. Ph.D. Eng. Liana Iures						
2.3 Coordinator (holder) of applied activities ⁶	Sl. Ph.D. Eng. Liana Iures						
2.4 Year of study ⁷	2	2.5 Semester	3	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)

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.

4.1 Curriculum	<ul style="list-style-type: none"> Mathematics I + II, General Chemistry
4.2 Competencies	<ul style="list-style-type: none"> Work with scientific, engineering and informatic fundamentals

5. Conditions (where applicable)

5.1 of the course	<ul style="list-style-type: none"> Average capacity classroom. Support: laptop, projector, whiteboard
5.2 to conduct practical activities	<ul style="list-style-type: none"> Building material laboratory, specialized equipment, building materials

6. Specific competencies acquired through this discipline

Specific competencies	<ul style="list-style-type: none"> Building materials basic properties ; Structural design
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"> Giving students knowledge in the discipline of Material Science 1 The course rounds off the scheduling of the students in basic knowledge about building materials and their properties
7.2 Specific objectives	<ul style="list-style-type: none"> Recognizing of typical structures and structural elements Design of structural elements in civil engineering Technologic and economic design for the erection, operation and maintenance works in civil engineering Complying to quality and sustainability requirements, specific to civil engineering constructions

8. Content ¹¹

8.1 Course	Number of hours	Teaching methods ¹²
1. Properties of Metallic Materials- Introduction to Metallic Materials (historical perspective; classification of materials); The atom, bindings between atoms; The cristalline structure of materials and lattice defects	3	Lecture, explanations, conversation and

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.).

2. Properties of Metallic Materials- Basic properties of materials and investigation method	3	comparative analysis
3. Properties of Metallic Materials - The microstructure of materials; Transformations in the solid state	2	
4. General Characteristics of Building Materials - Material's density; Porosity and Hole Volume; Water Action On Materials; Temperature Action on Materials; Materials Behaviour Under Load/Action; Material Testing:Destructive and Non – destructive Testings	10	
5. Special Materials for Buildings - Composite Materials: fibres, types of matrixis, general properties, fields of utilisations; Ultra – High performance concretes. Self – compacting concretes; Sustainability of buildings	10	
<p>Bibliography ¹³</p> <p>1. Cucuruz L.R.,Nicoara M.,Radu B.,Raduta A.-Aliaje neferoase Vol.1,Editura Politehnica Timisoara,2010;</p> <p>2. Smallman R.E., Bishop R.J., Modern Physical Metallurgy and Materials Engineering Butterworth-Heinemann 2000;</p> <p>3. Martin J.W., Precipitation Hardening: Theory and Applications, Butterworth-Heinemann 1998.</p> <p>4. Cucuruz L.R. Studiul materialelor – manual bilingv Ed. Mirton Timișoara 1996</p> <p>5. Serban V.R.,Nicora M.,Radu .,Raduta A.-Aliaje neferoase,Vol 1,Ed.Politehnica Timisoara,2010.</p> <p>6. Bob C., Jebelean E. – Material Science.Building Construction,Ed.Oriz. Universitare.ISBN978-973-638-417-2,Timisoara,2009</p>		
8.2 Applied activities ¹⁴	Number of hours	Teaching methods
1. Laboratory presentation and protection norms of labour	2	Laboratory work
2. Investigation methods; Microscopic investigations of metals, alloys and compounds;Mechanical testings; Heat treatments of steell	10	presentation, questions. Laboratory tests
3. Physical and mechanical properties of fibers; Determinations on composite materials; Determinations of bond between composite materials with concrete and masonry	16	regarding the properties and quality of the studied building materials. Evaluation of the experimental results
<p>Bibliography ¹⁵</p> <p>1. Iures,L., Badea C. -Building Materials Science, Practical Guide for Quality Evaluation, Ed.Eurostampa, ISBN 978-973- 687-776-6, Timisoara, 2008</p> <p>2. Bob C. Dencsak T. – Building Sustainability Civil Engineer Approach, LAP – Lambert Academic Publishing, GmbH, Saarbrucken, Germany, 2010;</p> <p>3. Buchman I. – Materiale de Constructii, I+II, Ed. Politehnica, ISBN 978-973-625-890-9 (I); 978- 606-554-197-9 (I) Timisoara, 2010</p>		

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.

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

- Students have good knowledge upon building materials properties used in construction fields
- Graduated bachelors are appreciated by the employer due to the fluency in choosing efficient and sustainable materials

10. Evaluation

Type of activity	10.1 Evaluation criteria ¹⁶	10.2 Evaluation methods	10.3 Share of the final grade
10.4 Course	Four theoretical subjects	Written exam	66%
10.5 Applied activities	S:		
	L: Practical activity during the laboratory work	Checking of the notebooks containing the tests results, summaries. All laboratory works are compulsory.	34%
	P¹⁷:		
	Pr: Attendance	The attendance is monitored	
10.6 Minimum performance standard (minimum amount of knowledge necessary to pass the discipline and the way in which this knowledge is verified ¹⁸)			
<ul style="list-style-type: none"> • Each exam subject need to be passed by minimum mark five • Laboratory activity have to be noted by minimum mark five 			

Date of completion

January 17th, 2018

**Head of Department
(signature)**

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**Course coordinator
(signature)**

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

12.02.2018

**Coordinator of applied activities
(signature)**

**Dean
(signature)**

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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.

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.