

SYLLABUS

1. Data about the program of study

1.1	Institution	The Technical University of Cluj-Napoca
1.2	Faculty	Faculty of Civil Engineering
1.3	Department	Buildings and Management
1.4	Field of study	Civil Engineering
1.5	Cycle of study	Bachelor of Science
1.6	Program of study/Qualification	Civil, Industrial and Agricultural Buildings /Engineer (English language)
1.7	Form of education	Full time

2. Data about the subject

2.1 Subject name	Construction Materials	Subject code	13.0
2.2 Course responsible / lecturer	Conf.Dr.Ing. Aciu Claudiu-Claudiu.Aciu@ccm.utcluj.ro		
2.3 Teachers in charge of seminars / Laboratory / project	Sl.Dr.Ing. Jumate Elena-Elena.Jumate@ccm.utcluj.ro		
2.4 Year of study	1	2.5 Semester	2
		2.6 Type of assessment	E
2.7 Subject category	Formative category		
	Optionality:		
			DF
			DOB

3. Estimated total time

3.1 Number of hours per week	4	of which:	Course	2	Seminars	-	Laboratory	2	Project	-
3.2 Number of hours per semester	56	of which:	Course	28	Seminars	-	Laboratory	28	Project	-
3.3 Individual study:										
(a) Manual, lecture material and notes, bibliography										31
(b) Supplementary study in the library, online and in the field										0
(c) Preparation for seminars/laboratory works, homework, reports, portfolios, essays										20
(d) Tutoring										14
(e) Exams and tests										4
(f) Other activities:										0
3.4 Total hours of individual study (suma (3.3(a)...3.3(f)))					69					
3.5 Total hours per semester (3.2+3.4)					125					
3.6 Number of credit points					5					

4. Pre-requisites (where appropriate)

4.1	Curriculum	Chemistry
4.2	Competence	Physics; Chemistry

5. Requirements (where appropriate)

5.1	For the course	Onsite lectures; the attendance is not mandatory, but it will be a plus for the final grade.
5.2	For the applications	Class attendance is mandatory.

6. Specific competences

Professional competences	Address problems critically Apply technical communication skills Ensure compliance with environmental legislation Communicate with construction crews Define technical requirements Use measurement instruments Maintain relationship with suppliers Advise on building matters Advise on construction materials Comply with legal regulations Satisfy technical requirements Synthesise information Monitor work site
Cross competences	Show initiative Assume responsibility Think analytically Work in teams

7. Expected Learning Outcomes

Knowledge	The student/graduate analyzes various construction materials using specific methods and equipment and interprets the obtained results in accordance with regulations in the construction field. The student/graduate identifies and describes the physico-mechanical and structural properties of construction materials and analyzes manufacturing technologies, composition, classification, and evaluation methods, taking into account applicable standards and regulations in construction. The student/graduate applies and interprets non-invasive methods for investigating the physico-mechanical properties of construction materials.
Skills	The student/graduate uses methods, materials, tools, and instruments from the field of construction materials. The student/graduate solves construction materials problems with applications in engineering and validates the obtained solution. The student/graduate describes physico-mechanical phenomena and processes. The student/graduate acquires and processes data and interprets theoretical and experimental results. The student/graduate determines, uses, and compares the physical and mechanical properties of the main construction materials for their application in the design and verification of structural elements.
Responsibilities and autonomy	The student/graduate applies the values of ethics and professional deontology in engineering. The student/graduate practices logical reasoning, evaluation, and self-evaluation in decision-making. The student/graduate engages in lifelong learning to acquire and implement knowledge as needed, using appropriate learning strategies. The student/graduate promotes dialogue, cooperation, respect for others, and interculturality. The student/graduate works effectively as a team member or as a team leader. The student/graduate selects and analyzes bibliographic sources. The student/graduate demonstrates autonomy in learning.

8. Discipline objectives (as results from the *key competences gained*)

8.1	General objective	Developing expertise in control and quality assurance in support of training.
8.2	Specific objectives	Assimilating theoretical knowledge concerning the characteristics of the main building materials and methods for their determination.

9. Contents

9.1. Lecture (syllabus)	Teaching methods	Notes
Stone in construction, stone materials in construction.	Power Point presentation	Onsite lectures
Aggregates for mortar and concrete.		
Mortars with inorganic binders: definition, classification, determination of the composition of mortars, characteristics of component materials.		
Mortars with inorganic binders: preparation, transport, properties, types of mortar.		
Concretes with inorganic binders: definition, classification, determination of the composition of concrete.		
Concretes with inorganic binders: component materials, structure, technology of concrete.		
Special types of concrete. Concrete products.		
Ceramic materials: generalities, classification, raw material, fabrication technology, ceramic materials used in construction.		
Non-destructive tests of materials: surface mechanical methods, acoustic tests, atomic, electric and combined tests.		
Glass materials: definition, fabrication technology, physical-mechanical characteristics, glass materials used in construction.		
Metals: ferrous metals, non-ferrous metals.		
Wood: wood construction materials.		
Insulation materials, thermal insulation, sound and hydrofuge insulation.		
Polymer materials. Protection and finishing materials.		
Bibliography		
Bibliography		
Claudiu ACIU, Daniela Lucia MANEA (2016). Building Materials. Ed. U.T. PRESS, Cluj-Napoca. ISBN 978-606-737-142-0.		
Daniela Lucia MANEA, Claudiu ACIU (2015). Materiale de Construcții și Chimie Aplicată. Building Materials and Applied Chemistry. Ed. U.T. PRESS, Cluj-Napoca. ISBN 978-606-737-139-0.		
Florica PAUL (2008). Civil Engineering Materials – Second Edition. Ed. Matrix Rom, Bucuresti. ISBN 973-973-755-315-7.		
9.2. Applications/Seminars	Teaching methods	Notes
Work protection and safety technique norms.	Presentation and applications	Onsite laboratory works
Tests and determinations on sand.		
Tests and determinations on gravel.		
Determining the granulometric curve of an aggregate and calculation of the optimum aggregate mixture for two sorts.		
Calculation of the optimum aggregate mixture for three and four sorts (successive approximations, graphic and sorts method).		
Determination of mortar composition. Determination of properties of mortar with mineral binders.		
Determination of concrete composition.		

Determination of properties of fresh concrete.		
Determination of properties of ceramic products (wall materials).		
Determination of properties of ceramic products (roofing materials).		
Metals: ferrous metals, non-ferrous metals.		
Non-destructive tests using ultrasonic methods.		
Determination of mechanical strengths of plaster, cement, mortar, concrete and masonries.		
Final evaluation.		
Bibliography Bibliography Claudiu ACIU, Daniela Lucia MANEA, Alexandru Gheorghe NETEA (2013). Building Materials and Applied Chemistry – Second Edition. Ed. U.T. PRESS, Cluj-Napoca. ISBN 978-973-662-893-1. Livia Ingrid DIACONU (2013). Chemistry for Civil Engineers. Ed. Societatii Academice “MATEI-TEIU BOTEZ”, Iasi. ISBN 978-606-582-045-6.		

10. Bridging course contents with the expectations of the representatives of the community, professional associations and employers in the field

Acquired skills will be necessary to the employees who work in the quality control of building materials, civil engineers as well as to the teachers in secondary education.

11. Evaluation

Activity type	11.1 Assessment criteria	11.2 Assessment methods	11.3 Weight in the final grade
11.4 Course	Multiple choice test	Written test	50%
11.5 Applications	Problems Test of laboratory works	Written test Test after each laboratory work	30% 20%
11.6 Minimum standard of performance			
Mark components: Laboratory (mark L); Problems (mark P); Multiple choice test (mark G).			
Mark computation formula: $N = 0,2L + 0,3P + 0.5G$; is calculated only if: $L \geq 5$, $P \geq 5$ and $G \geq 5$.			

Date of filling in: 2026-06-21		Title Surname Name	Signature
	Lecturer	Conf.Dr.Ing. Aciu Claudiu	
	Teachers in charge of application	Sl.Dr.Ing. Jumate Elena	

Date of approval in the department Buildings and Management

2026-06-23

Head of department
conf.dr.ing. Claudiu ACIU

Date of approval in the Faculty of Civil Engineering

2026-06-24

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prof.dr.ing Daniela Lucia Manea