



SYLLABUS

1. Data about the program of study

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| 1.1 | Institution | The Technical University of Cluj-Napoca |
| 1.2 | Faculty | Faculty of Civil Engineering |
| 1.3 | Department | Civil Engineering and Management |
| 1.4 | Field of study | Civil Engineering |
| 1.5 | Cycle of study | Bachelor of Science |
| 1.6 | Program of study/Qualification | Civil Engineering/ Engineer |
| 1.7 | Form of education | Full time |
| 1.8 | Subject code | 13.00 |

2. Data about the subject

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|-----|--------------------------------|---|-----|----------|---|-----|------------|------|-----|------------------|-------|
| 2.1 | Subject name | Building Materials | | | | | | | | | |
| 2.2 | Subject area | Civil Engineering | | | | | | | | | |
| 2.3 | Course responsible/lecturer | Associate Professor Ph.D. Eng. Claudiu ACIU claudiu.aciu@ccm.utcluj.ro | | | | | | | | | |
| 2.4 | Teachers in charge of seminars | Associate Professor Ph.D. Eng. Claudiu ACIU claudiu.aciu@ccm.utcluj.ro | | | | | | | | | |
| | | Lecturer Ph.D. Eng. Elena JUMATE elena.jumate@ccm.utcluj.ro | | | | | | | | | |
| 2.5 | Year of study | I | 2.6 | Semester | 2 | 2.7 | Assessment | Exam | 2.8 | Subject category | DD/DI |

3. Estimated total time

| | | | | | | | | |
|--|---------------------------------|-----|-----|-------------------|----|-----|---------------|-------|
| 3.1 | Number of hours per week | 4 | 3.2 | of which, course: | 2 | 3.3 | applications: | 2 |
| 3.4 | Total hours in the curriculum | 56 | 3.5 | of which, course: | 28 | 3.6 | applications: | 28 |
| Individual study | | | | | | | | hours |
| Manual, lecture material and notes, bibliography | | | | | | | | 35 |
| Supplementary study in the library, online and in the field | | | | | | | | - |
| Preparation for seminars/laboratory works, homework, reports, portfolios, essays | | | | | | | | 20 |
| Tutoring | | | | | | | | 10 |
| Exams and tests | | | | | | | | 4 |
| Other activities | | | | | | | | - |
| 3.7 | Total hours of individual study | 69 | | | | | | |
| 3.8 | Total hours per semester | 125 | | | | | | |
| 3.9 | Number of credit points | 5 | | | | | | |

4. Pre-requisites (where appropriate)

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| 4.1 | Curriculum | Applied Chemistry |
| 4.2 | Competence | Physics; Chemistry |

5. Requirements (where appropriate)

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| 5.1 | For the course | Class 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

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| Professional competences | <p>After completing the discipline, students must have theoretical knowledge about:</p> <ul style="list-style-type: none"> - mineral binders (hydraulic and non-hydraulic binders); - mortars with inorganic binders; - concretes with inorganic binders; - ceramic materials; - glass materials; - metals (ferrous metals, non-ferrous metals); - wood construction materials; - bitumen and bituminous binders; - insulation materials, - thermal insulation, sound and hydrofuge insulation; - polymer materials; - protection and finishing materials. <p>After completing the discipline, students will be able to:</p> <ul style="list-style-type: none"> - determine the properties of binders (plaster, lime, cement); - determine the mortar composition. Determination of properties of mortar with mineral binders; - determine the granulometric curve of an aggregate; - determine the optimum aggregate mixture; - determine of concrete composition. determination of properties of fresh concrete; - determine the properties of ceramic products (wall and roofing materials); - determine the properties of bitumen and bitumen impregnated materials; - determine the mechanical strengths of plaster, cement, mortar, concrete and masonries. |
| Cross competences | <ol style="list-style-type: none"> 1. Application of effective and responsible work strategies, punctuality, responsibility and personal liability based on principles, norms and values of professional ethics. 2. Applying the techniques of effective team work on different hierarchical levels. 3. Documentation in Romanian and in a foreign language, for professional and personal development through continuous training and effective adaptation to new technical specifications. |

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

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| 7.1 | General objective | Developing expertise in control and quality assurance in support of training. |
| 7.2 | Specific objectives | Assimilating theoretical knowledge concerning the characteristics of the main building materials and methods for their determination. |

8. Contents

| 8.1. Lecture (syllabus) | | Teaching methods | Notes |
|-------------------------|---|--------------------------|-------------------|
| 1. | Mineral binders: non-hydraulic binders. | Power Point presentation | Video – projector |
| 2. | Mineral binders: hydraulic binders. | | |
| 3. | Mortars with inorganic binders. | | |
| 4. | Mortars with inorganic binders. | | |
| 5. | Concretes with inorganic binders. | | |
| 6. | Concretes with inorganic binders. | | |

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| 7. | Concretes with inorganic binders. | | |
| 8. | Ceramic materials. | | |
| 9. | Glass materials. | | |
| 10. | Metals: ferrous metals, non-ferrous metals. | | |
| 11. | Wood: wood construction materials. | | |
| 12. | Bituminous binders. Bitumen. | | |
| 13. | Insulation materials, thermal insulation, sound and hydrofuge insulation. | | |
| 14. | Polymer materials. Protection and finishing materials. | | |

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.

| 8.2. Applications | | Teaching methods | Notes |
|-------------------|--|---|------------------|
| 1. | Work protection and safety technique norms. | Laboratory work presentation and applications | Laboratory works |
| 2. | Determination of properties of construction and molding plaster. | | |
| 3. | Determination of properties of lime. | | |
| 4. | Determination of properties of cement. | | |
| 5. | Determination of mortar composition. Determination of properties of mortar with mineral binders. | | |
| 6. | Determining the granulometric curve of an aggregate and calculation of the optimum aggregate mixture for two sorts. | | |
| 7. | Calculation of the optimum aggregate mixture for three and four sorts (successive approximations, graphic and sorts method). | | |
| 8. | Determination of concrete composition. | | |
| 9. | Determination of properties of fresh concrete. | | |
| 10. | Determination of properties of ceramic products (wall materials). | | |
| 11. | Determination of properties of ceramic products (roofing materials). | | |
| 12. | Tests and determinations on bitumen and bitumen impregnated materials. | | |
| 13. | Determination of mechanical strengths of plaster, cement, mortar, concrete and masonries. | | |
| 14. | Final evaluation. | | |

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.

9. 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.

10. Evaluation

| Activity type | 10.1 Assessment criteria | 10.2 Assessment methods | 10.3 Weight in the final grade |
|--|--------------------------|---------------------------------|--------------------------------|
| 10.4 Course | Multiple choice test | Written test | 60% |
| 10.5 Applications | Problems | Written test | 20% |
| 10.6 Laboratory works | Test of laboratory works | Test after each laboratory work | 20% |
| 10.7 Minimum standard of performance | | | |
| Mark components: Laboratory (mark L); Problems (mark P); Multiple choice test (mark G). | | | |
| Mark computation formula: $N = 0,2L + 0,2P + 0.6G$; is calculated only if: $L \geq 5$, $P \geq 5$ and $G \geq 5$. | | | |

| Date of filling in: | Teachers | Title Name | Signature |
|---------------------|--------------|---|-----------|
| 27.09.2018 | Course | Associate Professor Ph.D. Eng. Claudiu ACIU | |
| | Applications | Associate Professor Ph.D. Eng. Claudiu ACIU | |
| | | Lecturer Ph.D. Eng. Elena JUMATE | |

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| Date of approval in the CEM department | Head of CEM department |
| <u>28.09.2018</u> | Associate Prof. Ph.D. Eng. Claudiu ACIU |
| Date of approval in the Council of the Faculty of Civil Engineering | Dean |
| _____ | Associate Prof. Ph.D. Eng. Nicolae CHIRA |