# C O U R S E G U I D E – s h o r t f o r m

Academic year 2017-2018

| Course name[1] | **Heating processes bases** | | | | | Course code | | 3SM03 | |
|---|---|---|---|---|---|---|---|---|---|
| Course type[2] | DID | Category[3] | DI | Year of study | III | Semester | I | Number of credit points | 5 |

| Faculty | Of Materials Science and Engineering | Number of teaching and learning hours[4] | | | | | |
|---|---|---|---|---|---|---|---|
| Field | Materials Engineering | Total | L | T | LB | P | IS |
| Specialization | Materials Processing Engineering | 56 | 28 | - | 28 | - | - |

| Pre-requisites from the curriculum[5] | | |
|---|---|---|
| | Compulsory | Not applicable |
| | Recommended | Not applicable |

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| General objective [6] | Knowledge using of physical chemistry, alloys thermodynamics, chemistry and mathematics apparatus for creating of mathematics models, for thermodynamic parameters of chemical processes specific to materials science. |
| Specific objectives[7] | Analysis of chemical processes, thermodynamically, that occur at high temperatures – equilibrium, kinetics, pressure, initial conditions, variation of free entalphy, etc – in order to control processes that occur for alloys manufacture, thermal treatment, plastic deformation, powder metallurgy, welding, extractive metallurgy etc. |
| Course description[8] | 1. History of processes that occur at high temperatures<br>2. Vaporization processes at unicomponent and bicomponent systems<br>3. Formation and dissociation of oxides and carbonates<br>3.1 Analysis of the process AB=A+B<br>3.1.1 A and B are in pure state or as supersaturated solution<br>3.1.2 A and B form solutions with reciprocal and unlimited solubility<br>3.1.3 A and B form solutions with reciprocal and limited solubility<br>3.1.4 A and B are dissolved in a C solvent<br>3.2 Formation and dissociation of an oxide in different situations<br>3.2.1 MeO and Me are in pure state<br>3.2.2 MeO is dissolved in Me<br>3.2.3 Me'O and Me' are dissolved in Me<br>3.2.4 Oxygen potential<br>3.2.5 Formation and dissociation of iron oxides<br>4. Reduction of metallic oxides<br>4.1 Thermodynamics<br>4.2 Metalothermic reduction<br>4.3 Reduction for complex systems<br>4.3.1 Oxides that are in solution<br>4.3.2 Reaction product is dissolved in a solvent<br>4.3.3 Reaction product for chemical compound<br>4.3.4 Reduction of complex chemical compounds<br>4.3.5 Direct and non-direct reductions<br>5. Thermodynamics of reactions from C-S system.<br>6. Thermodynamics of reactions from C-H system. |

| Assessment | | Schedule[9] | Percentage of the final grade (minimum grade)[10] |
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| Continuous assessment | Class tests along the semester | W5, 10 and 14 | 10% (at least 5 mark) |

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|---|---|---|---|---|
| | Activity during laboratory work | | w1-w14 | 35% (at least 5 mark) |
| | Homework | | w12 | 15% (at least 5 mark) |
| Final assessment | Final assessment form[11] | Oral examination | Ses. | 40% (at least 5 mark) |
| | Examination procedures and conditions:<br>Oral exam, exam tickets. A ticket contains three exam subjects. It is required that two topics must be marked with marks of at least 5. Mark exam passage must be at least 5. Examination takes place if the lab, homework and each of the three tests have a proportion mark of at least 5, only. | | | |

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| Course organizer | Vasile Cojocaru Filipiuc, dr. eng., prof. | |
| Teaching assistants | Nicanor CIMPOEȘU, dr., eng., lect. | |

[1]Course name from the curriculum
[2] DF – fundamental, DID – in the field, DS – specialty, DC – complementary (from the curriculum)
[3] DI – imposed, DO –optional, DL – facultative (from the curriculum)
[4] Points 3.8, 3.5, 3.6a,b,c, 3.7 from the Course guide – extended form (L-lecture, T-tutorial, LB-laboratory works, P-project, IS-individual study)
[5] According to 4.1 – Pre-requisites - from the Course guide – extended form
[6] According to 7.1 from the Course guide – extended form
[7] According to 7.2 from the Course guide – extended form
[8] Short description of the course, according to point 8 from the Course guide – extended form
[9] For continuous assessment: weeks 1 – 14, for final assessment – colloquium: week 14, for final assessment-exam: exam period
[10] A minimum grade might be imposed for some assessment stages
[11] Exam or colloquium