

Curriculum

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| Course | 1 st Year | 2 nd Year | 3 rd Year | Total |
|--|----------------------|----------------------|----------------------|-----------------|
| Research work | 20 ECTS | 45 ECTS | 55 ECTS | 120 ECTS |
| Fulfilment of conditions* | 5 ECTS | 5 ECTS | 5 ECTS | 15 ECTS |
| Active participation in organised invited lectures | 10 ECTS | 10 ECTS | | 20 ECTS |
| Introductory seminar | 5 ECTS | | | 5 ECTS |
| Professional training | 5 ECTS | | | 5 ECTS |
| Optional courses | 15 ECTS | | | 15 ECTS |
| Total | 60 ECTS | 60 ECTS | 60 ECTS | 180 ECTS |

* Fulfilment of conditions includes: public presentation of research hypothesis of the PhD thesis before enrolment into the 2nd year, approved topic of PhD thesis before enrolment into the 3rd year and submission and successful defence of the PhD thesis.

| Course | Hours | | | | | Σ | ECTS |
|--------------|----------|----------|----------|----------|----------|----------|----------|
| | L | S | P | O | | | |
| TOTAL | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

| Optional courses | Hours | | | | | Σ | ECTS |
|--|-------|-----|-----|-----|-----|-----|------|
| | L | S | P | O | | | |
| Solid matter physics | 30 | 15 | 15 | 90 | 150 | 150 | 5 |
| Thermodynamics of materials | 30 | 15 | 15 | 60 | 150 | 150 | 5 |
| Solid state chemistry | 15 | 300 | 115 | 160 | 60 | 60 | 5 |
| Physical metallurgy | 40 | 5 | 0 | 115 | 160 | 160 | 5 |
| Constitution of multi-component alloy systems | 30 | 30 | 30 | 60 | 150 | 150 | 5 |
| Physics and chemistry of surfaces | 15 | 60 | 45 | 30 | 150 | 150 | 5 |
| Spectroscopy of materials | 30 | 15 | 15 | 60 | 150 | 150 | 5 |
| Microscopy of materials | 40 | 15 | 15 | 70 | 150 | 150 | 5 |
| Elastomechanics of materials | 30 | 15 | 15 | 60 | 150 | 150 | 5 |
| M5 – Modelling of processes | 15 | 45 | 60 | 30 | 150 | 150 | 5 |
| Functional materials | 30 | 15 | 15 | 90 | 150 | 150 | 5 |
| Nanomaterials | 30 | 45 | 75 | 150 | 150 | 150 | 5 |
| Ceramic materials | 30 | 45 | 75 | 150 | 150 | 150 | 5 |
| Polymeric materials | 0 | 0 | 45 | 115 | 160 | 160 | 5 |
| Selection of materials for engineering applications | 45 | 45 | 105 | 150 | 150 | 150 | 5 |
| Production and characterisation of materials | 30 | 15 | 30 | 75 | 150 | 150 | 5 |
| Heterogeneous equilibria in process engineering of metallic materials | 30 | 45 | 45 | 30 | 150 | 150 | 5 |
| Slags and fluxes | 30 | 90 | 30 | 150 | 150 | 150 | 5 |
| Solidification of metallic melts | 45 | 30 | 50 | 30 | 155 | 155 | 5 |
| Metallurgy of steel and metals | 30 | 90 | 30 | 150 | 150 | 150 | 5 |
| Process engineering – forming and casting | 15 | 60 | 45 | 30 | 150 | 150 | 5 |
| Heat transfer in materials engineering | 15 | 15 | 30 | 90 | 150 | 150 | 5 |
| Bogatenje mineralnih surovin in mehanska procesna tehnika | 45 | 45 | 30 | 125 | 125 | 125 | 5 |
| Modern construction technologies and numerical modelling of underground structures | 30 | 40 | 20 | 60 | 150 | 150 | 5 |
| Modelling of coalmining methods | 20 | 40 | 10 | 80 | 150 | 150 | 5 |
| Survey monitoring in geosciences | 20 | 20 | 10 | 75 | 125 | 125 | 5 |
| Methods of predicting changes in earth's crust | 20 | 20 | 10 | 75 | 125 | 125 | 5 |
| Advanced methods of geothermal energy exploitation | 35 | 10 | 10 | 95 | 150 | 150 | 5 |

Abbreviations used for the syllabus:

L – lectures

S – seminar

P – practice

O – other forms of educational activities (mainly project work)

ECTS – European Credits Transfer System (1 credit point equals a 30-hour student workload)

Grey – Grey written courses are not carried out in this academic year

There are 28 optional courses, each assigned 5 ECTS. In agreement with the supervisor, students can choose courses from other MSc and PhD programmes at the UL and/or other universities at home and abroad.

Optional courses listed further below have been designed so as to instruct on recent developments in science in a particular field and to cater for the needs of individual candidates (students from other programmes can take these courses upon their choice). The programme has a modular structure, with lecturer's engagement according to the needs of students. Organisation of the programme and unified examination will be coordinated by the person in charge of a particular course and by the person in charge of the study programme.

Optional courses include 15 to 30 hours of lectures and 45 to 60 hours of seminar or project work respectively, while the remaining 150 hours (5 ECTS) represent other forms of study or individual work of a student.

According to the fact that the programme in Materials Science and Engineering is an interdisciplinary programme, it is performed by three faculties (FNSE, FCCT and FMP). This offers doctoral candidates access to all research, bibliographic and counselling facilities of all three faculties and other institutions where the lecturers from the postgraduate third-cycle study programme work. The study sections are determined by the courses chosen by the doctoral candidate and by the theme of the PhD thesis. The course of the postgraduate third-cycle programme is designed so as to offer a wide palette of doctoral theses and courses that gravitate either towards the field of geomaterials/georesources and mining or metallic material or metallurgy or towards materials with mixed or non-metallic features. Since all three faculties (FNSE, FCCT and FMP) have a lot of experience and knowledge, which is apparent through appropriately equipped laboratories and adequate bibliographies of lecturers in the wider field of materials, the merging of scientific-research and pedagogical capabilities to provide the interdisciplinary doctoral programme in Materials Science and Engineering is logical.