Curriculum

NTF › OGRO › Study › Doctoral Degree › Materials Science and Engineering › Curriculum

Course	1st Year	2nd Year	3rd Year	4rd Year	Total
Research work	20 ECTS	45 ECTS	60 ECTS	55 ECTS	180 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**	**60 ECTS**	**240 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 L	S	P	O	Σ	ECTS
TOTAL	**0**	**0**	**0**	**0**	**0**	**0**

Optional courses	Hours L	S	P	O	Σ	ECTS
Solid matter physics	30	15	15	90		15
Thermodynamics of materials	30	15	15	0		5
Solid state chemistry	15	30	0	1	15	5
Physical metallurgy	40	5	0	1	15	5
Constitution of multi-component alloy systems	30	30	30	60		15
Physics and chemistry of surfaces	15	60	45	30		15
Spectroscopy of materials	30	15	15	0		5
Microscopy of materials	40	15	15	0		5
Elastomechanics of materials	30	15	15	0		5
M5 – Modelling of processes	15	45	60	30		15
Functional materials	30	15	15	90		15
Nanomaterials	30	45	0	75		15
Ceramic materials	30	45	0	75		15
Polymeric materials	0	0	45	1	15	5
Selection of materials for engineering applications	45	45	10	50		15
Production and characterisation of materials	30	15	30	75		15
Heterogeneous equilibria in process engineering of metallic materials	30	45	45	30		15
Slags and fluxes	30	90	0	30		15
Solidification of metallic melts	45	30	30	30		15
Metallurgy of steel and metals	30	90	0	30		15
Process engineering – forming and casting	15	60	45	75		19
Heat transfer in materials engineering	15	15	30	90		15
Bogatenje mineralnih surovin in mehanska procesna tehnika	45	45	30	5		12
Modern construction technologies and numerical modelling of underground structures	30	40	20	60		15
Modelling of coalmining methods	20	40	10	80		15
Survey monitoring in geosciences	20	20	10	75		12
Methods of predicting changes in earth's crust	20	20	10	75		12
Advanced methods of geothermal energy exploitation	35	10	10	95		15

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 chose 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.

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