<table>
<tr><td>COURSE NAME</td><td colspan="5">ALGEBRA I</td></tr>
<tr><td>Code</td><td>PMM216</td><td>Year of study</td><td colspan="3">1st year of graduate study</td></tr>
<tr><td>Course teacher</td><td>GORDAN RADOBOLJA</td><td>Credits (ECTS)</td><td colspan="3">5</td></tr>
<tr><td rowspan="2">Associate teachers</td><td rowspan="2"></td><td rowspan="2">Type of instruction (number of hours)</td><td>L</td><td>S</td><td>E</td></tr>
<tr><td>30</td><td>15</td><td></td></tr>
<tr><td>Status of the course</td><td>COMPULSORY AND ELECTIVE</td><td>Percentage of application of e-learning</td><td colspan="3">30%</td></tr>
<tr><td colspan="6">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="5">This course is the first part of a standard graduate algebra course which considers group and ring theory. In particular, the emphasis is on free groups, finitely generated abelian groups, their subgroups, certain classes of commutative rings with identity and certain classes of ideals. The gained knowledge should serve as a basis for the second part of the course and for continuation of studies on the postgraduate level.</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="5">Successful completion of undergraduate courses which consider algebraic structures; in internal case: Linear algebra and Algebraic structures.</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="5">Upon successful completion of the course student should
1) understand fundamental concepts of group and ring theory;
2) demonstrate familiarity with terminology of category theory;
3) distinguish the complexity of group structure problem in abelian and nonabelian case;
4) be able to give presentations of groups;
5) be capable of describing a structure of finitely generated abelian group;
6) distinguish certain classes of commutative rings by their specific division (factorization) properties;
7) show capacity for mathematical reasoning through analyzing, proving and explaining major results;
8) demonstrate accurate and efficient use of advanced algebraic techniques.</td></tr>
<tr><td>Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="5">1) Groups, categories, direct products and direct sums, internal products and sum. Product of a family of homomorphisms. (6 hours)
2) Free groups, free products, free abelian groups and their subgroups. Structure theory of finitely generated abelian groups. (6 hours)
3) The action of a group on a set. (2 hours)
4) The Sylow theorems. (2 hours)
5) Nilpotent and solvable groups. (2 hours)
6) Rings and homomorphisms of rings, ideals (prime and maximal ideals), direct product of rings. Chinese remainder theorem. (6 hours)
7) Factorization in rings, prime and irreducible elements. (2 hours)
8) Principal ideal domains, Euclidean and unique factorization domains. (2 hours)
9) Rings of fractions. Local rings (2 hours)</td></tr>
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Format of instruction	Lectures, supervising individually assigned tasks and seminars.		
Student responsibilities	Attending classes, giving report(s) on the research done in order to solve the appointed project problem and taking oral exam.		
Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*	Attending classes: 1,5 ECTS Work on project problems (seminars): 1 ECTS Oral exam: 2,5 ECTS		
Grading and evaluating student work in class and at the final exam	Each student reports on his/her solving the project problem assigned individually. The problem may consist of several different tasks (exercises). If the report is graded as successful, student is admitted to take the final oral exam. The final grade is a weighted sum of grades for problem solving report and oral exam, with relative weights 0.3 and 0.7, respectively.		
Required literature (available in the library and via other media)	**Title**	**No. of copies in the library**	**Availability through other media**
	T. W. Hungerford, *Algebra*, Springer, New York, 1996.		Pdf file on the Moodle platform
Optional literature (at the time of submission of study programme proposal)	1) D. S. Dummit, R.M. Foote, *Abstract Algebra*, J. Wiley and Sons, Inc., 2004. 2) S. Lang, *Algebra*, Addison-Wesley Publishing Company, Redwood City, California, 1984.		
Quality assurance methods that ensure the acquisition of exit competences	Exam results statistics. Students' quality assessment at the end of the semester carried out by the University authorized committee through anonymous polls.		
Other (as the proposer wishes to add)			