<table>
<tr><td>COURSE NAME</td><td colspan="5">VECTOR SPACES I</td></tr>
<tr><td>Code</td><td>PMM201</td><td>Year of study</td><td colspan="3">3rd yr undergraduate study
1st year graduate study</td></tr>
<tr><td>Course teacher</td><td>Gordan Radobolja</td><td>Credits (ECTS)</td><td colspan="3">6</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>0</td><td>30</td><td>0</td></tr>
<tr><td>Status of the course</td><td>compulsory course</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">- Deepen knowledge on vector spaces and linear operators
- Introduce Jordan form
- Define operator functions
- Introduce inner product spaces and typical operators on them</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="5">- Courses passed: Introduction to algebra with analythic geometry, Linear algebra</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="5">Students will be able to:
- analyze finite and infinite dimensional vector spaces and their properties, including the basis structure of vector spaces;
- give examples of fundamental notions and constructions in three dimensional Euclidean space;
- use the definition and properties of linear transformations and matrices of linear transformations and change of basis, including kernel, range and isomorphism;
- compute with the characteristic and minimal polynomial, eigenvalues and eigenspaces, find the geometric and algebraic multiplicities of an eigenvalue
- use methods from complex analysis in defining and calculate with operator function;
- compute inner products and determine orthogonality on vector spaces, including Gram-Schmidt orthogonalization.</td></tr>
<tr><td>Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="5">- Finite dimensional vector spaces (4)
- Linear operators and their matrices (4)
- Dual space and dual operator (2)
- Algebras and homomorphisms (1)
- Minimal polynomial and spectrum (2)
- Invariant subspaces (1)
- Nilpotent operators (2)
- Jordan normal form of a linear operator (3)
- Convergence in an operator spaces (1)
- Operator functions (3)
- Inner product spaces and norm (4)
- Operators on inner product spaces (3)</td></tr>
<tr><td>Format of instruction</td><td colspan="5">Frontal lectures and exercises</td></tr>
<tr><td>Student responsibilities</td><td colspan="5">Lectures and exercises attendances are obligatory.</td></tr>
<tr><td>Screening student</td><td colspan="5">Lectures attendance (2)</td></tr>
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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)*	Tests (2) Oral exam (2)
Grading and evaluating student work in class and at the final exam	Students write two tests during semester as a prerequisite for oral exam. Final grade is based on the result of tests (50%) and oral exam (50%).
Required literature (available in the library and via other media)	**Title** H. Kraljević, *Vektorski prostori*, skripta, Sveučilište u Osijeku, 2008. S. Kurepa, *Konačno dimenzionalni vektorski prostori i primjene*, Liber, Zagreb, 1992. J. S. Golan, *The Linear Algebra a Beginning Graduate Student Ought to Know*, Kluwer, 2004.
Optional literature (at the time of submission of study programme proposal)	P. R. Halmos, *Finite Dimensional Vector Spaces*, Van Nostrand, New York, 1958. S. Lang, *Linear algebra*, Addiseon-Wesley, Reading, 1973. K. Horvatić, *Linearna algebra*, PMF – Matematički odjel, HMD, Zagreb, 1995.
Quality assurance methods that ensure the acquisition of exit competences	Discussion in classes and official student survey.
Other (as the proposer wishes to add)	