<table>
<tr><td>NAME OF THE COURSE</td><td colspan="5">Methods of Applied Mathematics</td></tr>
<tr><td>Code</td><td>PMM821</td><td>Year of study</td><td colspan="3">3 PD, VI. semester</td></tr>
<tr><td>Course teacher</td><td>Prof.dr.sc. Saša Krešić-Jurić
Dr.sc. Andrijana Ćurković</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>P</td><td>S</td><td>V</td><td>T</td></tr>
<tr><td>30</td><td></td><td>30</td><td></td></tr>
<tr><td>Status of the course</td><td>Obligatory</td><td>Percentage of application of e-learning</td><td colspan="3">20</td></tr>
<tr><td colspan="6">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="5">To introduce students to the fundamentals of perturbation methods for ordinary differential equations, calculus of variations and integral equations.</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="5">The student must have passed the following courses: Introduction to Mathematical Analysis, Mathematical Analysis I and Linear Algebra.
The student must have taken the following courses: Mathematical Analysis II, Mathematical Analysis III, Oridnary Differential Equations.</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="5">Knowledge of the fundamentals of the perturbation methods and their applications to computing approximate solutions to ordinary differential equations. Knowledge of the fundamentals of calculus of variations, finding the stationary points of functionals, applications to different problems in mathematics and physics. Knowledge of the fundamentals of Volterra and Fredholm integral equations and methods for finding their solutions.</td></tr>
<tr><td>Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="5">1. Perturbative methods: nonlinear oscillations, Poincare-Lindstedt method, asymptotic analysis, singular perturbations, boundary layers, inner and outer approximations, WBK approximation.
2. Calculus of variations: functionals, admissible functions, stationary points of functionals, Gateaux derivative, necessary conditions for the existence of extrema, Euler-Lagrange equation, conservation laws, n-th order calculus of variations, functionals dependent on several functions, Hamilton's principle, Hamilton's equations, isoperimetric problems, Rayleigh-Ritz method.
3. Integral equations: types of integral equations, Volterra equation, Picard's method, Neumann series, Fredholm equation with separable kernel and symmetric kernel, Hilbert-Schmidt theorem.</td></tr>
<tr><td>Format of instruction</td><td colspan="5">Lectures and tutorial sessions.</td></tr>
<tr><td>Student responsibilities</td><td colspan="5">Class attendance and taking partial and final exams.</td></tr>
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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)*	Class attendance 2 ECTS Partial exams 1 ECTS Written exams 1 ECTS Oral Exams 1 ECTS
Grading and evaluating student work in class and at the final exam	Partial exams, written exam and oral exam.
Required literature (available in the library and via other media)	J.D. Logan, Applied Mathematics, 3rd. ed., Wiley-Interscience, Hoboken, 2006.
Optional literature (at the time of submission of study programme proposal)	L. Debnath, P. Mikusinski, Introduction to Hilbert Spaces with Applications, 3. izdanje, Elsevier Academic Press, London, 2005.
Quality assurance methods that ensure the acquisition of exit competences	Student evaluations following completion of the course. The evaluations are administered according to the regulations of the University of Split.
Other (as the proposer wishes to add)	