

<b>Study Programme:</b> Computer Science		
<b>Course Unit Title:</b> Introduction to Computational Science		
<b>Course Unit Code:</b> CS252		
<b>Name of Lecturer(s):</b> Nataša Krklec Jerinkić		
<b>Type and Level of Studies:</b> Bachelor Academic Degree		
<b>Course Status (compulsory/elective):</b> Compulsory		
<b>Semester (winter/summer):</b> Summer		
<b>Language of instruction:</b> Serbian (primary), English (secondary)		
<b>Mode of course unit delivery (face-to-face/distance learning):</b> Face-to-face		
<b>Number of ECTS Allocated:</b> 7		
<b>Prerequisites:</b> None		
<b>Course Aims:</b>		
<ul style="list-style-type: none"> <li>• Knowledge of selected fundamental algorithms in computational science</li> <li>• Knowledge of essential notions and methods in computational science</li> <li>• Knowledge of basic techniques for analysis of numerical algorithms</li> </ul>		
<b>Learning Outcomes:</b>		
<ul style="list-style-type: none"> <li>• Ability to choose the appropriate numerical method for concrete problems</li> <li>• Ability to interpret numerical results</li> <li>• Ability to implement numerical algorithms efficiently in selected programming languages</li> </ul>		
<b>Syllabus:</b>		
<i>Theory</i>		
<ul style="list-style-type: none"> <li>• Error, stability, convergence, including truncation and round-off</li> <li>• Function approximation including Taylor's series, interpolation, extrapolation, and regression</li> <li>• Numerical differentiation and integration (Simpson's Rule, explicit and implicit methods)</li> <li>• Differential equations (Euler's Method, finite differences)</li> <li>• Direct and iterative methods for linear systems</li> <li>• Linear least squares problems</li> <li>• Eigenvalue decomposition; singular value decomposition</li> <li>• Introduction to modeling</li> </ul>		
<i>Practice</i>		
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<b>Suggested Reading:</b>		
1. Uri Ascher and Chen Greif: A First Course in Numerical Methods. SIAM, 2011.		
2. Gilbert Strang: Computational Science and Engineering. Wellesley, MA: Wellesley-Cambridge Press, 2007.		
<b>Weekly Contact Hours:</b> 5	<b>Lectures:</b> 3	<b>Practical work:</b> 2
<b>Teaching Methods:</b>		
Lectures; revisions of the material; active students' participation in problem solving; knowledge test –colloquia; application of the taught material on real world examples.		
<b>Knowledge Assessment (maximum of 100 points):</b>		

<b>Pre-exam obligations</b>	points	<b>Final exam</b>	points
Colloquia	40	Oral exam	60
The methods of knowledge assessment may differ; the table presents only some of the options: written exam, oral exam, project presentation, seminars, etc.			