

Study program	Level of the study program		First cycle	
	Study program name		Physics and Informatics Education	
Course name	NUMERICAL METHODS			
Course ID	Semester	Course status	ECTS credits	L+E
CS215	V	MANDATORY	5	2+3
Lecturer				
Aims and intended learning outcomes	<p>The aim of the course is to introduce the students to basic algorithms for numerical solving characteristic problems that arise both in pure mathematics and in applications in science and technology.</p> <p>Upon succesful completion of the course students will be able to:</p> <ul style="list-style-type: none"> - Be familiar with algorithms for solving standard problems of a numerical nature. - To be able to independently program numerical algorithms. 			
Course content				
<ul style="list-style-type: none"> -Algorithms for calculating polynomials and rational functions. -Algorithms for calculating basic elementary functions -Algorithms of the interpolation type. -Algorithms for working with matrices. -Algorithms for matrix decompositions. -Algorithms for numerical differentiation. -Dual numbers and automatic differentiation. -Algorithms for numerical integration. -Algorithms for the numerical solution of differential equations. -Applications in physics and technology. -Monte-Carlo method and simulations. -Introduction to linear programming. 				
Student workload (hours)		Grading		
Lectures and Exercises	75	Assessment method	Points	
Exam preparation	50	Midterm exam	50	
		Final exam	50	
Total	125			
		Total	100	
Literature				
1.	W. Cheney & D. Kincaid, Numerical Mathematics and Computing, Brooks Cole (2012)			
2.	L.N. Trefethen & D. Bau III, Numerical Linear Algebra, SIAM (1997)			
3.	W. Ford, Numerical Linear Algebra with Applications using MATLAB, Elsevier (2014)			
Remarks				