

Program	Level		First cycle				
	Name of the program		Pure Mathematics, Mathematics Education, Applied Mathematics				
COURSE							
Course title	Computer Algebra Systems						
Course code	Semester	Course status	ECTS	Contact hours (L+AE+LE)			
CS 230	III	Mandatory course	4	2+0+2			
Lecturer							
Course Goals	The objectives of this course are to introduce with the basic concept, the way of using and applying algebraic computer systems. Further, in the course they are also considered basic programming methodologies in algebraic computer systems based on programming paradigms specially designed to solve mathematically oriented problems.						
Learning Outcomes	<p>Upon successful completion of this course, students should be able to:</p> <ul style="list-style-type: none"> - Understand the basic concepts of the most well-known algebraic computer systems; - How to use computer algebra systems for manipulations with symbolic expressions; - How to use computer algebra systems for numerical calculations; - How to use computer algebra systems to visualize geometric problems and their solutions; - Creating interactive documents in computer algebra systems; - To understand the principles of computer algebra systems 						
COURSE CONTENT							
<ul style="list-style-type: none"> - The basic characteristics of the most well-known computer algebra systems (Mathematica, Maple, MatLab, MathCad). Techniques of manipulation with symbolic expressions in the Mathematica. Techniques for solving numerical problems and visualization in the Mathematica computer system. - Functions in the computer algebra systems Mathematica. λ-calculus and λ-functions. The concept of functional programming and programming based on rules. The concept of programming based on pattern matching. - Basic program constructions in Mathematica. Procedural programming in the Mathematica. - A brief overview of the Maple. Numerical and symbolic manipulations in the Maple. Creating interactive documents in the Maple. Basic program construction in the Maple. - A brief overview of the MatLab computer system . Numerical and symbolic manipulations in MatLab. Basic program constructions in MatLab. 							
LITERATURE							
<p>[1] Ž. Jurić: “Interaktivna računanja u programskom paketu Mathematica”, skripta, PMF Sarajevo [2] R. E. Maeder: “Programming in Mathematica”, Addison-Wesley [3] E. Pilav: “Programiranje u programskom paketu Mathematica”, skripta, PMF Sarajevo [4] Ž. Ban: “Osnove MatLab-a”, skripta, Fakultet elektrotehnike i računarstva, Sveučilište u Zagrebu [5] “Maple user manual”, Waterloo Software</p>							
STUDENT WORKLOAD (hours in a semester)							
Lectures	30	Exercises	30	Individual work	40	T o t a l	100
GRADING				REMARKS			
Criterion	Maximum points	Minimum points					
Midterm exams	50	25					
Final exam	50	25					
T o t a l	100	55					