Study program	Level of studies	First cycle
	Study program name	Physics and Informatics Education

Course name	**LABORATORY IN COMPUTER ALGEBRA SYSTEMS**			
Course ID	Semester	Course status	ECTS credits	L+E
CS131	**I**	**MANDATORY**	**2**	**0+2**

Lecturer	

Aims and intended learning outcomes	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. Upon successful completion of this course, students should be able to: - 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

- 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.

Student workload (hours)		Grading	
Lectures and Exercises	30	Assessment method	Points
Exam preparation	20	Midterm exam	50
		Final exam	50
Total	50		
		Ukupno	100

Literature

[1] Ž. Jurić: "Interaktivna računanja u programskom paketu Mathematica", skripta, PMF Sarajevo
[2] R. E. Maeder: "Programming in Mathematica", Addisson-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

Remarks