Program	Level	Second cycle		
	Name of the program	Applied Mathematics, Pure Mathematics		

COURSE				

Course title	**Nonlinear optimization**			
Course code	Semester	Course status	ECTS	Contact hours (L+AE+LE)
AMAT 430	I/III	Mandatory course/Elective course	7	3+2+0
Lecturer				
Course Goals	The goal of this module is to introduce students to basic methods for nonlinear optimization with and without constraints by using different nonsequential search methods.			
Learning Outcomes	Through this module students will learn how to solve real-life problems with and without teacher guidance. Special attention will be given to the role of the mathematician in the analysis of a real-life problem and its solutions.			

COURSE CONTENT

- Theory and algorithms of nonlinear programming;
- Models and algorithms for polynomial problems;
- Constrained and unconstrained optimization;
- Lagrange and Conic duality theory; Kuhn-Tacker conditions; Geometric interpretation;
- One dimensional search methods; Newton-Raphson method; Quadratic and cubic search; Fibonacci method; Method of golden ratio;
- Nonsequential search methods; Random search; Factorial search, Univariate and relaxation search,
- Gradient-based algorithms; Acceleration based algorithms; Method of conjugate gradients;
- Penalty function methods; Other search techniques;

LITERATURE

[1] Donald A. Pierre: Optimization Theory with Applications, Dover Publications, Inc.
[2] Charles S. Beightler, Don T. Phillips, Douglass J. Wile: Foundations of Optimization, Prentice-Hall
[3] Dimitris P. Bertsekas: Nonlinear Programming, Athena Scientific

STUDENT WORKLOAD (hours in a semester)							
Lectures	45	Exercises	30	Individual work	100	T o t a l	175

GRADING			REMARKS	
Criterion	Maximum points	Minimum points		
Testovi tokom kursa	50	25		
Final exam	50	30		
T o t a l	100	55		