UNIVERSITY OF CRAIOVA
Faculty of Mathematics and Computer Science
Department of mathematics
Fundamental domain : Exact sciences
Domain: Mathematics
Master : Applied mathematics
Form : Day classes
Duration of studies : 2 years
Approved with academic year 2009-2010

Experimental Mathematics
Syllabus

Course coordinator: Prof. dr. Constantin P. Niculescu
Code: MA 215
Second Cycle: MASTER
Second Year , Semester 1, Laborator 28 hours
No. of credits: 3
Domain: Mathematics
Type : optional

Objectives : To approximate the weak solutions for a class of mechanical problems. Simulations for various parameters of the materials.
Necessary background : Mathematical modeling using differential equations, Numerical Analysis.
Evaluation : Coloquium (C).

Contents:

I Preliminaries: Elements of Scientific Calculus in MATLAB.

II Mechanical problems
2.1 Elastic problems. Weak solutions; discretization; simulations.
2.2 Elasto-piezoelectric problems. Weak solutions; discretization; simulations.
2.2 Viscoelastic problems. Weak solutions; discretization; simulations.

   Bibliography:
J. Alberty, C. Carstensen, S. A. Funken, *Remarks around 50 lines of Matlab: short finite element implementation*, Numerical Algorithms, 20 (1999), 117-137.
J. Alberty, C. Carstensen, S. A. Funken, R. Klose, *Matlab implementation of the finite element method in elasticity*, 2002.
C. Carstensen, R. Klose, *Elastoviscoplastic finit element analysis in 100 lines of Matlab*, J. Numer. Math, 2002, 1-30.
S. Hueber, A. Matei and B. I. Wohlmuth, *Efficient algorithms for problems with friction*, SIAM Journal on Scientific Computating, 2007.
T.J. Hughes, *The Finite Element Method*, Prentice-Hall, 1987.