CMDIE - Computeroriented **M**ethods for Solving **D**ifferential- and **I**ntegral- **E**quations, WS2003/04

1. Course Details

Lectures:	In four blocks, during winter semester 03/04, monthly on two consecutive days: Tuesday and Wednesday, 10-12 a.m. and 14-16 p.m, Room T05.
Labs:	After lectures, 12-13 a.m. and 16-17 p.m., Small Computer Room, (see detailed schedule).
Instructor:	Roman Trobec, Room 1.08, roman.trobec@ijs.si
Course Materials:	http://www-e6.ijs.si/~roman/usalz/cmdie03_04
Office Hours:	During Labs

2. Textbooks

Main Text:
M.T.Heath: *Scientific Computing: An Introductory Survey, Second Edition,* McGraw Hill, New York 2001, (SC); Lecture notes accessible on*:* http://www.cse.uiuc.edu/heath/scicomp/notes
Supplementary Text:
W.H.Press at all.: *Numerical Recipes in C,* Cambridge University Press, On-Line version, http://www.ulib.org/webRoot/Books/Numerical_Recipes/

3. Course Overview and Objectives

This course attempts to provide a deeper understanding of the issues involved in designing and implementing computer programs intended to solved numerical problems. It is targeted to students of all areas interested in learning some of the fundamental mathematical techniques and algorithms used in scientific computing. No specialised knowledge is expected from these fields. The course material covers: floating-point arithmetic, algorithms for solving system of equations, eigenvalue algorithms, and numerical differentiation and integration. After attending this course, students will be able to devise a numeric algorithm, to estimate its complexity and to implement it with an computer program. They could also follow the forthcoming summer course (*High Performance Scientific Computing- HPSC*) focused on designing and implementing parallel programs in the field of scientific computing. Grading will be based on homework, class projects and written exam.

4. Course Work

Two hours of lectures will be followed by one hour of labs. MatLab program environment will be used for implementation of simple examples.
Homework: Seven homework assignments will be given to each student for individual work.
Class Projects: Up to two students will work together on class projects, that has to involve some practical problem. Working program code and a short written report is expected.
Final Exam: The final written exam will cover the course material including review questions from the text book and solved homework exercises. Students can use notes and books.

5. Schedule

Table below shows the tentative schedule of CMDIE in WS 2003/04. There might be some variations.

#	Date	Day	Topic	Reading	Homework/ Project
1	Oct. 28	Tuesday a.m.	Numerical Analysis	SC Chap. 1	
2	Oct. 28	Tuesday p.m.	Floating Point Operations	SC Chap. 1	HW-1 Ch1
3	Oct. 29	Wednesday a.m.	System of Equations	SC Chap. 2	
4	Oct. 29	Wednesday p.m.	System of Equations	SC Chap. 2	HW-2 Ch2
5	Nov. 18	Tuesday a.m.	System of Equations	SC Chap. 2	
6	Nov. 18	Tuesday p.m.	Least Squares	SC Chap. 3	
7	Nov. 19	Wednesday a.m.	Least Squares	SC Chap. 3	HW-3 Ch3
8	Nov. 19	Wednesday p.m.	Eigenvalue Problems	SC Chap. 4	
9	Dec. 16	Tuesday a.m.	Eigenvalue Problems	SC Chap. 4	HW-4 Ch4
10	Dec. 16	Tuesday p.m.	Non-linear Equations	SC Chap. 5	
11	Dec. 17	Wednesday a.m.	Non-linear Equations	SC Chap. 5	HW-5 Ch5
12	Dec. 17	Wednesday p.m.	Interpolation	SC Chap. 7	
13	Jan. 15	Thursday a.m.	Interpolation	SC Chap. 7	HW-6 Ch7
14	Jan. 15	Thursday p.m.	Numerical Integration	SC Chap. 8	
15	Jan. 16	Friday a.m.	Integralequations	SC Chap. 8	HW-7 Ch8
16	Jan. 16	Friday p.m.	Exam terms: CMDIE and HPSC	Project and HW, due to exam	

6. Candidates

If you wish to register, please send an e-mail on address: roman.trobec@ijs.si
or write your name and E-mail in the table below. Start of CMDIE is foreseen for October 28. at 10 a.m.

No.	Name, E-mail
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