PHY 329: Introductory Computational Physics
SYLLABUS

Fall 2016
Unique #: 56255
T-TH 3:30-5:00PM, RLM 5.120

INSTRUCTOR: Prof. Alex Demkov, office RLM 13.206, Phone: 471-8560
e-mail: demkov@physics.utexas.edu
OFFICE HOURS: Monday 2-4 p.m. and by appointment

TA: TBD
OFFICE HOURS:
e-mail

Course web page: http://web2.ph.utexas.edu/classes/demkov/phy329/

Textbook:

- Steven G. Chapra, "Applied Numerical methods with *MATLAB* for Engineers and Scientists", 3rd edition, McGraw-Hill, 2012.

Reference Books:

- P. Harrison, "Computational methods in physics, chemistry and biology", Wiley, 2001.
- R. H. Landau and M.J. Pàez, "Computational Physics", Wiley, 2nd Ed. 2007.
- M.P. Allen and D.J. Tildesley, "Computer simulation of liquids" Clarendon Press, 1992.
- A. Gilat, and V. Subramanian, "Numerical Methods for Engineers and Scientists", Wiley 2007.
- D. M. Smith, "Engineering Computation with MATLAB", Pearson Education, 2008.
- W. H. Press, S.A. Teuklosky, W.T.Vetterling, B.P. Flannery, "Numerical Recipes in Fortran 77", 2nd edition, Cambridge University Press, 1992.
- W. H. Press, S.A. Teuklosky, W.T.Vetterling, B.P. Flannery, "Numerical Recipes in Fortran 90", 2nd edition, Cambridge University Press, 1996.

Grading:

Two in-class midterms: 15% each
A project will be used for a final exam: 30 %
Homework: 40%

Homework:
Seven homework assignments will be given. **No late homework will be accepted. No late homework will be accepted. No late homework will be accepted. No late homework will be accepted. No late homework will be accepted. No late homework will be accepted.**

Languages: MATLAB

Syllabus:

The week of August 21	Lecture 1	Introduction
The week of August 28	Lectures 2&3	Roots of Equations
The week of September 4	Lectures 4&5	System of Linear Equations
The week of September 11	Lectures 6&7	Linear System and Matrices
The week of September 18	Lectures 8&9	Matrix Computation
The week of September 25	Lecture 10	Optimization

September 29, First Midterm

The week of October 2	Lectures 11&12	Fitting and Interpolation
The week of October 9	Lectures 13&14	Interpolation and Fourier Transforms
The week of October 16	Lectures 15&16	Numerical Integration& Differentiation
The week of October 23	Lectures 17&18	Numerical Integration& Ordinary Diff. Eq. (ODE)
The week of October 30	Lectures 19&20	ODE I
The week of November 6	Lecture 21	ODE II

November 10, Second Midterm

The week of November 13	Lectures 22, 23	ODE II and Partial Differential Eq. (PDE)
The week of November 20	Lecture 24	PDE
The week of November 27	Lectures 25&26	Molecular Dynamics

November 8, Final Project is announced

December TBD, 12:00 noon, Final Project is due

Homework:

HW1 roots and optimization
HW2 linear systems
HW3 matrices, eigenvalue problem
HW4 curve fitting
HW5 numerical differentiation and integration
HW6 ordinary differential equations
HW7 partial differential equations
