University of Waterloo

Term and Year of Offering: Spring 2015

Course Number and Title: PHYS 239, Computational Physics 2

Lecture Times, Building and Room Number: MTh 1:00-2:20; PHY 235

Instructor’s Name, Office Location, Office Hours, Contact: David Yevick, PHY 356, 12:00-1:00, 2:20-4:30 Mon. and 12:00-1:00 Thurs. or anytime through email or by appointment, yevick@uwaterloo.ca; ext 35200

TA’s Name, Office, Office Hours, Contact: Chiamaka Okoli, PHY 211A, Accessible through email or in laboratory, c2okoli@uwaterloo.ca

Course Description:

This course will extend scientific programming capabilities learned in Phys. 139 with emphasis on solving physical problems with a range of languages and techniques. The course will first introduce Octave/MATLAB and C++ programming and will then examine a range of physical problems and numerical algorithms with emphasis on partial differential equations and Monte-Carlo methods.


Topics to be covered: (Parts of some chapters will be omitted)

Week 1 Octave Programming Chapter 1-2

Week 2 – 5.5  C++ Programming (overview) Chapters 3-12

Week 5.5 – 8  Numerical Analysis, Linear Algebra, FFT, ODE Chapters 19-22

Week 9 – 12 Monte-Carlo Methods, Partial Differential Equations Chapters 23-24

Evaluation:

Assignments 40%

Mid-term/Final Examination 10/50%