PHYSICS 401 - Computational Physics
MWF, 9:10-10:00 am, MPHY 213

Course description: Learn numerical simulation methods for solving physical problems.
Prerequisites: Basic courses in mechanics, quantum mechanics and calculus.
Learning Outcomes: Able to use Java to solve physics problems in mechanics and quantum mechanics.
Instructor: Prof. Siu A. Chin
Office: MPHY 407; best contact by email: chin@physics.tamu.edu
Website: http://faculty.physics.tamu.edu/chin/
Hours: M 2-4 pm, T 3-4 pm and by appointments.
TelephoneNumber: Dept. phone only: 845-7717
Grades: Weekly project assignments: 75%; one final individual project: 25%
All lectures and weekly assignments will be posted in the above website.
Letter scale: A=90-100; B=80-89; C=70-79; D=60-69; F below 60. (Can be lower by 5.)

Weekly course schedule:

Week 1: Tinkering with Java. Chapter 2
2: More tinkering and the Kepler problem. Chapter 2, 3, 5
3: More tinkering and symplectic integrators. Chapter 3, 5
4: More tinkering and the 3-body problem. Chapter 5
5: Chaotic motion and iterative maps. Chapter 6
6: " " Chapter 6
7: Fractals. Chapter 13
8: Molecular dynamic simulations. Chapter 8
9: " " Chapter 8
10: Random Process and MC Integration. Chapter 11
11: Phase transition, the 2-D Ising Model. Chapter 15
12: Variational Quantum Simulations. Chapter 16
13: Exact Quantum Algorithms. Chapter 16
14: Time-dependent problems. Chapter 16
15: Quantum Monte Carlo methods. Chapter 16

ADA statement The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, currently located in the Disability Services building at the Student Services at White Creek complex on west campus or call 979-845-1637. For additional information, visit http://disability.tamu.edu.

Academic Integrity Statement: