

**PHYSICS 401 - Computational Physics**Note: **MWF, 9:10-10:00 am only**, 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.
- Telephone:* *Dept. phone only:* 845-7717
- Textbook:** *Computer Simulation Methods*, Third Edition, Pearson-AW, 2007.  
by H. Gould, J. Tobochnik and W. Christian. **Can be downloaded from the Web.**  
Additional reading materials will be assigned in class
- 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:	Solving Schrödinger’s equation.	Chapter 16
11:	Time-dependent problems.	Chapter 16
12:	Random Process and MC Integration.	Chapter 11
13:	Variational Monte Carlo methods.	Chapter 16
14:	Diffusion/Path Integral Monte Carlo methods.	Chapter 16
15:	Phase transition, the 2-D Ising Model.	Chapter 15

**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:**

The Aggie Honor Code is “*An Aggie does not lie, cheat, or steal or tolerate those who do.*” For more information, refer to the Honor Council Rules and Procedures on the web at <http://www.tamu.edu/aggiehonor>.