Instructor:
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Cardwell #13

Main Textbook
Nicholas J Giordano & Hisao Nakanishi
Computational Physics
2nd edition (2005)
ISBN-10: 0131469908

Course Description
We will study a number of representative physics problems where the underlying theory is well understood but exact analytic solutions are difficult (or impossible) to obtain, so they have to be solved numerically.

I will be using python programming language in the class. If you have a strong background in programming and have a preference for another language, you can use it to do the problems.

Do not worry if you do not have any prior experience of programming. Even though it is helpful, you DO NOT need to have a prior knowledge of programming to take this class. If you know programming well you will learn how to use this knowledge to solve physics problems. If you do not know any programming you will learn how to program and how to use it in physics at the same time.

You will need a USB memory stick to save your classwork. Python programs can be written and run in a web-browser (see http://jupyter.org), so you can do your homework on any computer with internet access. Everyone will get assignments commensurate to their programming skills.

List of Covered Topics
- Physical problems described by first order ordinary differential equations
- Physical problems described by Second order ordinary differential equations
- Oscillations
- Chaotic systems
- Laplace equation
- Wave equation
- Heat equation
- Simulating random processes
- Fourier transforms
- Data analysis

Grade Policy

The grade will be based on 10 homeworks (50% of the grade) and one final project (The remaining 50% of the grade). The grading scale is usual: A = 100%-90%, B = 90%-80%, C = 80%-70%, ... You are encouraged to discuss homework problems and the final project with other students or any other person, but you must do all the work yourself.

Kansas State University has an Honor and Integrity System based on personal integrity, which is presumed to be sufficient assurance that, in academic matters, one’s work is performed honestly and without unauthorized assistance. Undergraduate and graduate students, by registration, acknowledge the jurisdiction of the Honor and Integrity System. The policies and procedures of the Honor and Integrity System apply to all full and part-time students enrolled in undergraduate and graduate courses on-campus, off-campus, and via distance learning. The Honor and Integrity System website can be reached via the following URL: www.k-state.edu/honor (Links to an external site.). A component vital to the Honor and Integrity System is the inclusion of the Honor Pledge which applies to all assignments, examinations, or other course work undertaken by students. The Honor Pledge is implied, whether or not it is stated: “On my honor, as a student, I have neither given nor received unauthorized aid on this academic work.” A grade of XF can result from a breach of academic honesty. The F indicates failure in the course; the X indicates the reason is an Honor Pledge violation.

Students with disabilities who need classroom accommodations, access to technology, or information about emergency building/campus evacuation processes should contact the Student Access Center and/or their instructor. Services are available to students with a wide range of disabilities including, but not limited to, physical disabilities, medical conditions, learning disabilities, attention deficit disorder, depression, and anxiety. If you are a student enrolled in campus/online courses through the Manhattan or Olathe campuses, contact the Student Access Center (Links to an external site.) at accesscenter@k-state.edu, 785-532-6441; for Salina campus, contact the Academic and Career Advising Center (Links to an external site.) at acac@k-state.edu, 785-826-2649.

All student activities in the University, including this course, are governed by the Student Judicial Conduct Code (Links to an external site.) as outlined in the Student Governing Association By Laws (Links to an external site.), Article V, Section 3, number 2. Students who engage in behavior that disrupts the learning environment may be asked to leave the class.