Syllabus: PHYS 100, Spring 2022
Exploring Physics with a Computer

Instructor:

Dr. Robert Beaird; Office: Brockman Hall 239

Phone: ext. 2791

Email: rpb5@rice.edu

Office Hours: TBD

If you have any questions or comments about the course, the assignments, the grading, *etc*., please let me know. You are welcome to contact me even outside of the posted office hours, and, if I cannot accommodate you at that time, we can set an appointment for a mutually agreed upon time. Please feel free to contact me by email at any time, and I will reply at my earliest convenience.

Learning Objectives:
The primary focus of the class is to acquire and develop the basic skills necessary to use a computer to explore and solve physics problems that are either unwieldy or difficult to solve with pencil and paper alone. Students will learn the basics of numerical and computational modeling, model simple and not-so-simple classic physics problems, delve deeper into more realistic versions of classic physics problems, and create visualizations to aid exploration and understanding of these problems. While this course will use computational methods, this is not a formal programming or computational course.

Familiarity with the topics covered in Phys 101 is assumed. Higher-level physics topics will be explained on an as-needed basis as the course progresses.

Announcements
Announcements posted on the Canvas course page under the “Announcements" tab will be automatically e-mailed to the course roster. Students are responsible for checking Canvas for announcements that might have been caught by a spam filter or the like.

Weekly Class Meetings:
Class will be held every Thursday from 2:30 to 3:20 PM in room HBH 423, or on Zoom during those weeks for which the university has designated instruction as online-only. There will be some in-class lecturing/explanation, but a significant focus will be the in-class discussion of and exploration of physics concepts and problems from a numerical point of view.

Suggested Materials:
There is no formal required text for this course. There will be material and resources mentioned in class and posted to Canvas. Students are encouraged to share/mention materials that they find helpful. If you have never coded/programmed before, and you are interested in taking a Python-based approach to solving problems, then you may wish to check out the following:

> *A Student's Guide to Python for Physical Modeling, Updated Edition* [2018];
> Jesse M. Kinder & Phillip Nelson; ISBN: 978-0691180571

The material in this text may be helpful if you have no programming experience and are looking to learn the fundamentals, but, honestly, the basics covered in the text can be found in various places online with a bit of help from your favorite search engine.

Suggested Software:
1. Microsoft Excel or Microsoft Office 365*
2. Mathematica or WorlframAlpha Pro*
3. VPython (https://vpython.org)

The software marked with an asterisk is provided to students by Rice University and is available at https://kb.rice.edu/student-software. The details of obtaining VPython will be provided in class and on Canvas. (*Note: Google Sheets, Maple, MATLAB, Fortran, C++, an abacus and slide rule, etc. can be used instead of the software listed above. However, the instructor will only commit to trouble shooting the suggested software.)*

Assignments:
Assignments will be assigned more or less weekly and will be of two types: in-class activities, and out-of-class homework. These assignments will generally be due by the beginning of class the following week. The instructor may also provide occasional reading materials (background reading, academic articles, example problems and methods, *etc*.).

In lieu of a written final exam, there will be final project, completed either individually or in groups of two (for sufficiently challenging problems), with a short final presentation to be given during the final exam period. The details of the project will be given approximately halfway through the semester. Students can turn in their final project (code/pseudocode, visualizations, synopsis of results, *etc*.) up until the date of the final, as scheduled by the registrar.

Calculation of Semester Grade:
Your Physics 100 semester grade will be determined as follows:

> Participation/Discussion ---------- 30%
> Assignments ---------- 50%
> Final Project---------- 20%

Students who receive a weighted average of 90% or greater will receive a grade of at least A-, while those obtaining a weighted average of 75% or greater will receive a grade of at least a B-, and those students who obtain averages of 60% or greater will receive a grade of at least C-. The instructor may lower these cut-offs at the end of the semester, but they will not be raised.

The Honor System:
At Rice we believe very strongly in the Rice Honor System: it applies to all work submitted for a grade in the course, and we perform our due diligence as instructors in upholding it.

Students with Disabilities:
Any student with a documented disability seeking academic adjustments or accommodations is requested to speak with the instructor during the first two weeks of class. All such discussions will remain as confidential as possible. Students with disabilities are encouraged to also contact Disability Support Services in the Allen Center (e-mail: adarice@rice.edu, phone: 713-348-5841) during the first two weeks of class so that timely and appropriate arrangements may be made.

Title IX
Rice University cares about your wellbeing and safety. Rice encourages any student who has experienced an incident of harassment, pregnancy discrimination or gender discrimination or relationship, sexual, or other forms interpersonal violence to seek support through The SAFE Office. Students should be aware when seeking support on campus that most employees, including the PHYS 101 instructional team, are required by Title IX to disclose all incidents of non-consensual interpersonal behaviors to Title IX professionals on campus who can act to support that student and meet their needs. For more information, please the SAFE Office page (safe.rice.edu) or email titleixsupport@rice.edu.

Mutability of the syllabus:
The information contained in this syllabus may be subject to change with reasonable advanced notice, as deemed appropriate by the instructor.