

Computer Based Experimentation and Physics Computing
01:750:326
Fall 2020

Instructor: Professor Vitaly Podzorov

Summary: Experiments in mechanics, electromagnetism, and modern physics, emphasizing error analysis. Uses the computer as a laboratory tool for symbolic manipulation, data collection, data analysis, simulation, and report writing.

This course is required for the Professional, Applied, General, and Planetary options.....

Pre-requisites: 01:750:202 or 01:750:204 or 01:750:228 or 01:750:273

Co-requisites: None

Meeting times: One 80 minute lecture

Lecture: M6 (5:00 pm – 6:20 pm)

Lab- One three hour lab per week ...

Text: An Introduction to Error Analysis, J. R. Taylor, 2nd Ed. University Science Books.

LMS: Canvas

Provisional Plans for Remote Instruction:

Activities in this course consist of **one lecture** and **one lab** per week. The lectures will be given synchronously via Canvas during the regular class hours as per the official Rutgers schedule of classes. Lecture notes (and other supporting materials) will be posted on the course's website after each lecture. Students who cannot join lectures in Canvas synchronously will be able to study the lecture materials off-line by downloading the lecture notes. Additionally, there will be a regular office hour (held remotely via Canvas at a scheduled time) and a flexible on-demand office hour that can be arranged between individual students (or a group of students) and the Prof./TAs each week (also held via Canvas). The students are also encouraged to contact the Prof./TA via email, if they have a particular question about the course or assignment. Instead of the occasional in-class quizzes that we used to have during the lectures in this course, we will now have occasional homeworks that will be posted on the course's website and can be done asynchronously.

The labs will be filmed by the instructor beforehand in such a way that the experimental observations and results can be seen (and measurements taken off screen) while watching the videos. These videos will be uploaded on Youtube, so that students can carefully watch them and generate their own data set in each lab. The lab manuals detailing the step-by-step experimental procedure will also be available online. The students are then expected to create individual lab reports with an introduction, experiments' description, their own data analysis, as well as conclusions.

In summary:

1. Asynchronous activities and resources: (1) lecture notes (and other course's materials, such as excerpts from books) posted online; (2) videos of each lab that students will watch and create their own data/analysis; and (3) occasional homeworks.

2. Synchronous activities: (1) one scheduled lecture per week via Canvas, (2) one scheduled office hour via Canvas, and (3) on-demand individual office hours by students' request.
 - a. Students who cannot participate in some or all of the synchronous activities are encouraged to use lecture notes posted on the course's website and schedule on-demand office hours.
3. Homeworks will be announced and posted on the course's website (with a due date that is usually in a week). Students will be able to do them remotely and submit an electronic version via an upload on the course's website.
4. No exams or quizzes will be given in this course. The major part of the students' grade will come from the lab reports that students will be creating based on their work with the lab videos.
5. Office hours: there will be one fixed office hour held at two different days/times by the Prof. and by TA(s), and additionally we will have a flexible on-demand office hour that students can request.

Technology requirements: a laptop or a desktop computer with a high-speed internet connection.

Provisional Grading Plans:

Homeworks: 30%

Lab reports: 70%

Schedule (provisional):

Week:	Topic
1	Propagation of Errors
2	Wavelength of light
3-4	Distribution functions
5	Least square fit
6	Damped harmonic motion
7-8	Forced harmonic motion
9-10	Fourier Analysis
11-12	Onset of chaos

Academic Integrity:

Students are expected to maintain the highest level of academic integrity. You should be familiar with the university policy on academic integrity: <http://academicintegrity.rutgers.edu/academic-integrity-policy/> Violations will be reported and enforced according to this policy.

Use of external sources to obtain solutions to homework assignments or exams is cheating and is a violation of the University Academic Integrity policy. Cheating in the course may result in penalties ranging from a zero on an assignment to an F for the course to expulsion from the University. Posting of homework assignments, exams, recorded lectures, or other lecture materials to external sites without the permission of the instructor is a violation of copyright and constitutes a facilitation of dishonesty, which may result in the same penalties as explicit cheating.

Not only does the use of such sites violate the University's policy on Academic Integrity, using such sites interferes with your achievement of the learning you are paying tuition for. Assignments, quizzes, and exams are given not simply to assign grades, but to promote the active learning that occurs through completing assignments on your own. Getting the right answer is much less important than learning how to get the right answer. This learning is critical to your success in subsequent courses and your careers.

Student wellness Services

Student Counseling, ADAP & Psychiatric Services (CAPS) wellness for non-emergency psychological health issues services (848) 932-7884, 17 Senior Street, New Brunswick, NJ 08901
<http://health.rutgers.edu/medical-counseling-services/counseling/>

Violence Prevention & Victim Assistance (VPVA), (848) 932-1181, 3 Bartlett Street, New Brunswick, NJ 08901, <http://www.vpva.rutgers.edu/>

Office of Disability Services (848) 445-6800, Lucy Stone Hall, Suite A145, Livingston, 54 Joyce Kilmer Avenue, Piscataway, NJ 08854, <https://ods.rutgers.edu/>

Scarlet Listeners for confidential peer counseling and referral hotline, (732) 247-5555,
<http://www.scarletlisteners.com>