

Analytical Physics 1A
01:750:123
Fall 2020

Instructor: Professor Daniel Friedan

Summary: An introductory calculus based course in physics focusing on Classical Mechanics. Topics include one and multi-dimensional kinematics, Newton's Laws, static equilibrium, circular motion, kinetic energy and work, potential energy, power, linear momentum, and gravitation.

This is the first part of two semester sequence (with 01:750:124), which serves as a pre-requisite for 01:750:227, primarily for students majoring in engineering or physics.

Co-requisite: Calculus 1 01:640:151 (01:640:135 accepted if taken prior to enrollment)

Meeting times: One 80 minute lecture per week, offered at 3 times (all identical).

Lecture: F1 (8:40 am – 10 am), F4 (1:40 pm – 3:00 pm), F5 (3:20 pm – 4:40 pm)

Recitations: One 80 minute recitation per week.

Text: College Physics by OpenStax, available for free online at: <https://openstax.org/details/college-physics>

LMS: Canvas

Provisional Plans for Remote Instruction (subject to change):

- The following resources and activities will be provided asynchronously:
 - The lecture slides will be posted in advance of the lecture.
 - Video clips of the weekly demos will be posted in advance of the lecture, and a short quiz may be required to be answered prior to the lecture. In addition, periodic video clips based on specific concepts related to that week's material will be posted on Canvas (before and/or after lecture), followed by taking a short quiz.
 - The weekly homework will be assigned and submitted via Expert TA.
 - Several periodic minilab reports will be assigned throughout the semester and will be submitted via Canvas.
- The weekly lectures and recitations will be streamed synchronously.
 - The lectures (only) will be recorded and posted to Canvas for later viewing.
 - Students who miss a recitation, and have a valid reason for missing it, may attend another recitation (only one with the same TA!). This will be allowed by permission only.
 - The lowest two quizzes will be dropped.
 - There will also be other opportunities provided throughout the semester for extra credit.
- Weekly homeworks will be assigned and submitted via Expert TA.
- Exams, quizzes, pre-labs, and mini-lab reports will be assigned, posted and graded on Canvas.
- Exams will be a mixture of multiple choice, numerical, and word problems. Students will have a time window within which the exam can be taken (probably 24 hours), and once

started the exam will be a fixed time (i.e. 80 minutes for the midterms, 3 hrs for the final exam). Academic integrity (see below) must always be followed! You may NOT contact anyone or receive/give any assistance via any means or use other resources during the exam. The exam answers must be entirely your own.

- The professor and the TA will hold online weekly office hours. In addition, there will be a Canvas discussion board setup for students to post questions at any time during the semester; this is strongly encouraged, including during the synchronous lectures. In addition, the professor can setup one-on-one virtual meetings with students as needed.
- Technology requirements: Students will need a microphone (for lectures, recitations, and office hours that are conducted online) and either a phone camera or a scanner (for possibly needing to upload material into Canvas for homeworks, lab reports, or discussion board questions). A webcam is not required.

Provisional Grading Plans:

- First Midterm: 15%
- Second Midterm: 15%
- Final Exam: 20%
- Workshop Quiz: 15%
- Mini-labs: 10%
- Homework: 15%
- Class Participation: 10% (this includes asynchronous activities, such as pre-labs, pre/post lecture quizzes etc.)

Schedule (provisional):

Week:	Topic
Week 1	Measurement and 1D Motion
Week 2	1D Motion
Week 3	Vector Algebra; Velocity and Acceleration Vectors
Week 4	2D and 3D Motion, Relative Motion
Week 5	Force and Motion – I
Week 6	Force and Motion – II; Friction. Static equilibrium.
Week 7	Force and Motion – II; Circular motion. Drag force.
Week 8	Kinetic energy and work.
Week 9	Variable Forces; Power; Potential Energy. Conservation of Energy.
Week 10	Conservation of Energy.
Week 11	Center of Mass. Linear Momentum – I
Week 12	Center of Mass. Linear Momentum – II
Week 13	Gravitation – I
Week 14	Gravitation – II.

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>