

PHYS 2070: General Physics I

Class Meeting: TTH 8:00 am to 9:15 am Section 003 (CRN 80223) in Daniel 100B

TTH 9:30 am to 10:45 am Section 003 (CRN 80223) in Daniel 100B

TTH 11:00 am to 12:15 am Section 003 (CRN 80223) in Daniel 100B

Office Hours: T 12:30 pm to 2:00 pm and Th 12:30 pm to 2:30 pm and
Wed 10:30 am to noon

Office hours are tentative and subject to change

Course Description:

PHYS 2070 General Physics I 3 (3) Introductory course for students who are not majoring in physical science or engineering. This course covers such topics as mechanics, waves, fluids, and thermal physics. Credit for a degree will be given for only one of PHYS 1220, 2000, or 2070. Preq or concurrent enrollment: MTHS 1020 or MTHS 1040 or MTHS 1050.

Course Learning Outcomes:

1. The student will demonstrate the ability to think critically and to use appropriate concepts to analyze qualitatively problems or situations involving physics.
2. The student will demonstrate the ability to use appropriate mathematical techniques and concepts to obtain quantitative solutions to problems in physics.
3. The student will develop the ability to read, evaluate, and interpret numerical and general scientific information and apply physical principles to real-world problems then communicate effectively the reasoning behind the solution.

Students may vary in their competency levels on these abilities. You can expect to acquire these abilities only if you honor all course policies, attend class regularly, complete all assigned work in good faith and on time, and meet all other course expectations of you as a student.

It is important to develop critical thinking ability rather than mere memorization of facts. This is a vital skill set for your successful career in various fields. To develop these skills you will work on in-class activities and homework assignments that involve defining and analyzing problems related to physics, identifying and evaluating options, inferring likely outcomes and probable consequences, then evaluating and explaining the reasons.

I have high expectations but I will provide scaffolded assistance so you can be successful. Students are expected to review materials daily, practice many problems and seek out assistance in a timely manner.

Clemson Thinks2:

This course is designed to be part of the Clemson Thinks2 (CT2) program. "Critical thinking is reasoned and reflective judgment applied to solving problems or making decisions about what to believe or what to do. Critical thinking gives reasoned consideration to defining and analyzing problems, identifying and evaluating options, inferring likely outcomes and probable consequences, and explaining the reasons, evidence, methods and standards used in making those analyses, inferences and evaluations. Critical thinking is skeptical without being cynical, evaluative without being judgmental, and purposefully focused on



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I am excited to embark on a journey through physics with you this semester. I love teaching and engaging with students.

I received my PhD in Physics from Clemson University in 2002 and I have been teaching ever since. I love watching as students grasp the mathematical beauty of the world we live in!

I am happily married with three beautiful children. We foster children as well, so my house is always bustling with activity. I love to swim, kayak and paddle board. When it gets too cold for that, I love to hike.

I am excited that we will be able to complete this course together. Feel free to contact me with any questions.

following reasons and evidence wherever they may lead.” <http://www.insightassessment.com/FAQ/FAQs-General-Critical-Thinking/What-is-Critical-Thinking-CT2>

Critical Thinking Methods of Teaching:

Critical thinking requires students to be active learners who engage in the material. Students need to be making decisions about what to believe or how to evaluate information. Critical thinking gives reasoned consideration to all aspects of a problem.

Critical Thinking Artifacts:

A variety of assignments (quizzes, homework and exams) in this course can be utilized as artifacts to demonstrate your refinement of critical thinking skills over the term. CAR assignments (see page 3) may also be used to demonstrate your ability to critically assess a realistic scenario, draw inferences from data sets, journal articles and propose an appropriate solution.

Your evaluating and explanation of the physics found in a refereed paper will require critical thinking skills. Additionally, the RUSH assignment will serve as a capstone assignment. This assignment will allow the student to pick a short sports clip and analyze the motion occurring in the situation. Collected data will be evaluated by the student and inferences made. A successful project will demonstrate a student's ability to read, evaluate, and interpret numerical and general scientific information and apply physical principles to a real-world problem then communicate effectively the reasoning behind the solution.

Academic Continuity Plan for this Class:

Clemson has developed an academic continuity plan for academic operations. Should University administration officially determine that the physical classroom facility is not available, class will be conducted in a virtual (online) format. The University issues official disruption notifications through email/ www/ test notification / social media. When notified, use one of the following links to navigate for Clemson Canvas, where you will find important information about how we will conduct class:

- Primary access link: www.clemson.edu/canvas
- Secondary access link, if needed: <https://clemson.instructure.com/>
- You can also use the Canvas Student App.

Our activities for teaching and learning will occur through our Canvas course. This includes: watching recorded videos in Canvas and answering questions pertaining to the lecture.

On E-Learning Day, August 29, 2019, a real-time test of the academic continuity plan will be conducted. Our class will be conducted by accessing your assignment through Canvas/Assignments/Class Participation/e-learning day assignment and quiz and following the included instructions.

Prepare to do your BEST

- Carefully watch the pre-lecture videos prior to class and complete the class preparation quiz.
- Preview lecture notes and skim through the text for the material we will cover. Education research shows that we have to be exposed to material three times before it begins to sink in.
- Lecture notes can be printed from Canvas prior to lecture. Or annotated on your tablet.
- Engage fully in class by listening or taking notes. While playing a game or surfing the web may be fun, it does not assist in your quest for physics knowledge.
- Come to class each day with your equation sheet and calculator ready to solve problems.
- Ensure to bring a laptop or tablet or smart phone with ExpertTA to participate in the class engagement activities.
- Watch recorded lectures of the course if you wish to review or are still unclear about a concept.
- Really DO the homework. Rely on your brain not the internet.
- Study often and in small spurts. The concepts in this course build on one another. Studying little by little will overall reduce your study time and result in improved grades.
- Learn how to quickly open a QR code on your device.





Course Content:

Topic 1: Introduction

Units, dimensional analysis, significant figures, converting units, order of magnitude calculation

Topic 3: Vectors in Physics

Scalars and vectors, components of vectors, Trigonometry review, adding and subtracting vectors, relative motion

Topic 2: One-Dimensional Kinematics

Position, distance and displacement, average speed and velocity, instantaneous velocity, acceleration, kinematics equations of motion

Topic 4: Two-Dimensional Kinematics

Motion in two dimensions, projectile motion, range

Topic 5: Newton's Laws of Motion

Force and mass, Newton's Laws of Motion, Forces in two-dimensions, weight force, normal force, frictional force, spring force, tension force

Topic 6: Applications of Newton's Laws

Solving Newton's Laws, Connected objects, circular motion

Topic 7: Work and Kinetic Energy

Work done by a constant force, kinetic energy, work-energy theorem, work done by a variable force, power

Topic 8: Potential Energy and Conservation of Energy

Conservative and non-conservative forces, potential energy, conservation of mechanical energy, work done by non-conservative forces

Topic 9: Linear Momentum and Collisions

Linear momentum, impulse, conservation of linear momentum, elastic and inelastic collisions, center of mass

Topic 10: Rotational Kinematics and Energy

Angular position, velocity and acceleration, rotational kinematics, rolling motion, rotational kinetic energy, moment of inertia, conservation of energy

Topic 11: Rotational Dynamics and Static Equilibrium

Torque, static equilibrium, angular momentum, conservation of angular momentum

Topic 12: Gravity

Newton's laws of universal gravitation, Kepler's Laws of planetary motion, gravitational potential energy and energy conservation

Topic 13: Oscillations About Equilibrium

Periodic motion, simple harmonic motion, period of a mass on a string, pendulum period, damped and driven oscillators

Topic 14: Waves and Sound

Types of waves, waves on a string, harmonic wave functions, sound waves, wave intensity, Doppler effect, superposition and interference, standing waves, beats

Topic 15: Fluids

Density, pressure, Archimedes principle and buoyancy, fluid flow, Bernoulli's Equation

Critical Analytical Reflection

A formative assessment prior to course examinations, the student will engage with directed questions designed to evaluate the major learning objective covered for the exam. Students will then engage with group members on critically assessing a case study, drawing inferences from data sets, journal articles and provided scenarios.

To get the most out of this exercise you will want to not only remember the definitions and equations but be able to understand and apply them to unique situations. In order to do this you must draw connections between the many ideas that we have covered and judge how best to solve a given problem.

We will use Scooby and the gang to quickly assess our thinking.

Scooby and Shaggy look at an unusual situation and yell "It's a ghost!"



This is our physical interpretation of the world and the physics student must go deeper than this.



Fred, Velma and Daphne use critical thinking to evaluate the problem.

They arrive at a conclusion about the ghost based on reasoning and deduction. We will work through problems in this class evaluating our interpretation of our world on first blush and then through critical reasoning.

Attendance Policy:

Attendance is required. Because of the pace at which material is covered and because of the cumulative nature of the principles involved it is recommended that students not miss a class unless there is a compelling reason. Students are requested to wait 10 minutes in the unlikely event that your instructor is late for class.

Exams:

There will be four exams during the semester and one final exam. Each exam is worth 150 points or 15% of your final course grade with the lowest of the 5 exam grades being dropped which makes the four regular exam and the final exam worth a total of 60% of your total grade. For the first exam that you are unable to complete, you will have to use the missed exam as your dropped exam grade. In the extremely unlikely case that more than one exam is missed, you must obtain an excuse which may be verified by University sources before a makeup exam will be granted. All exams will be taken using the Respondus Lockdown browser. This browser must be downloaded through the Clemson University download page. It is the student's responsibility to ensure that the browser is working prior to taking each exam. Students who turn in a paper copy of the exam will have **5 points deducted** from their exam grade.

You may use a calculator during the tests. An equation sheet will be provided. You will also be allowed to bring in several blank sheets of scratch paper. You will need to bring your computer to your assigned testing room. Please make sure your computer is fully charged before entering the room as there are not enough outlets for all. The test will be administered through Canvas.

"Nothing comes close to the precision with which physics enables you to understand the world around you." Neil deGrasse Tyson

Homework:

The 16 homework assignments are each worth 12.5 points for a total of 200 points or 20% of your course grade. Homework is due at 11:59 pm on the day indicated in the schedule. Late homework can be submitted for up to 50% credit until 12/06/2019 at 11:59 pm. No homework grades are excused. All due dates are recorded on the calendar at the end of the syllabus.

To register for Expert TA, The cost is \$32.50 per semester per student. Expert TA offers students the option of a 14-day free trial. Any work done during the trial, including grades received, is saved and available after the license is purchased.

Engagement:

Engagement grades are worth a total of 100 points or 10% of your final class grade. **Each engagement grade is worth the same amount of credit (regardless of the number of raw points).** Your answers will be graded 40% by correctness plus 60% for participation. Thus, an incorrect answer gets you a score of 60% while a correct answer gets you a score of 100%. No answer (an absence) gives no credit. Each day of participation is worth the same number of points (5 per day) regardless of how many questions are posed. We will use audience response polling 24 days during the semester.

Engagement Makeup:

The 4 lowest (or missed) engagement grades will be dropped. If you miss class due to university excused absences or illnesses documented by a physician, you will have an opportunity to make up polling points. In order to take advantage of this, you must complete the Makeup Participation assignment under the Assignments tab in Canvas.

Class Preparation:

These assignments are indicated on the syllabus in purple and labeled as Pxx or FCI. These assignments are located through Canvas as quizzes and one mastering physics assignment. These assignments are intended to be completed after you have watched the pre-lecture video. The lowest 2 grades will be dropped.

Final Examination:

You may test for the final exam with any of my sections, all in Daniel 100B. The final cumulative examination will be given as follows:

| | | |
|-------------------|-----|-----------|
| TTH, 8-9:15am | Fri | 7-9:30pm |
| TTH, 9:30-10:45am | Wed | 8-10:30am |
| TTH, 11-12:15pm | Wed | 3-5:30pm |

Extra Credit:

There are several extra credit opportunities listed under modules with their due dates shown in the course schedule. This is the ONLY extra points offered in the course. There will be NO ADDITIONAL POINTS awarded at the end of the semester, so if you feel you might be borderline you will want to complete these assignment. No late assignments will be accepted.

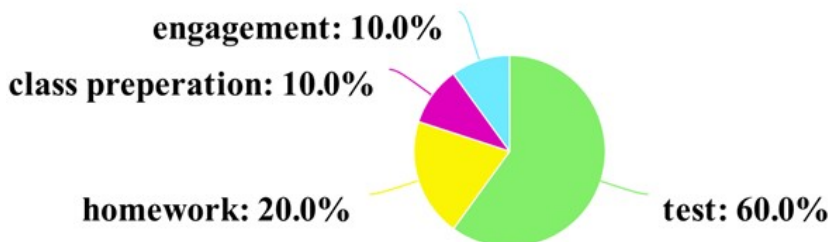
Determination of Final Grade:

Letter grades are calculated by dividing the total number of points earned by ten. Extra Credit adds for a total of 1% of your final course grade. No further changes to grades will be made after the last day of class. Points available are as follows:

| | |
|----------------|--|
| 4 test & final | highest 4 grades at 150 points = 600 possible points |
| Engagement | 100 points |
| Class Prep | 100 points |
| Homework | 200 points |
| Extra Credit | 10 points |
| <hr/> | |
| Total | 1010 points |

The following scale will be used:

- A: 900-1000 points
- B: 800-899
- C: 700-799
- D: 600-699
- F: 0-599 points



Required Materials:

The following materials are required for successful participation in the course:

- [Expert TA](#) account which can be purchased through Canvas for **\$32.50** per semester per student. Expert TA will be used for homework, class preparation quizzes and in class engagement. You may also purchase a code at the on-campus bookstore at a slightly higher rate.
- Download [OpenStax Urone and Hinrichs College Physics](#) (ISBN-10: 1-947172-01-8) **\$0.00**
- An internet device such as a laptop, tablet or cell phone with Respondus Lockdown browser installed. Respondus must be installed through the Clemson University offered download.
- Calculator (Any scientific calculator is fine.)
- [Adobe Reader \(free\)](#) or [Adobe Creative Cloud Acrobat \(free through Clemson\)](#)
- Ancillary information (texts, videos, audio, slides, notes) is provided in my Canvas course.
- Logger Pro 3 should be downloaded on your computer. This program is available through Clemson CCIT on the downloads page.

Class Questions:

We will use this app for our engagement questions in class every day.

- 1) Go to classquestion.com/students and click "Click here to register". This link will allow you to register for the site.
- 2) Once you have registered, go to classquestion.com/students and sign in.
- 3) Click "Add Class" at the bottom. Enter the Class Code for this class: **FPQMG** and then click "Add Class".
- 4) Your class will be added to the dropdown menu at the top. You can now click the "Sign In" button to log into your class!

You will be asked upon signing in to enter your student ID (CUID). Your CUID a unique, eight-digit number starting with C. You can find this on your Tiger-One card or if you know your username you can look it up here: Whoami.clemson.edu.

If you do not have the right CUID, I will not be able to link your grade with your performance.

OpenStax Urone and Hinrichs College Physics:

[OpenStax Urone and Hinrichs College Physics](#) is an OER textbook. OER (Open Educational Resources) are a wide range of peer reviewed, constantly updated educational resources, including textbooks that are free. At a time when textbook prices have rose over 1,000 percent in the last 40 years, at a rate even higher than tuition, OER make a critical difference in student success by reducing the student's financial burdens and allowing them to concentrate on learning. The organization of the text does not necessarily match with the order of material presentation in class but should serve as a resource for extra problems, further clarification of material as well as introduction to material.

Make Sure you Have These



Expert TA purchased through Canvas
\$32.50



Download OpenStax Urone and Hinrichs College Physics
FREE



Vernier Logger Pro 3
FREE

ClassQuestion

Classquestion.com
FREE

General Policies and Procedures:

Students are expected to adhere to all policies and procedure outlined by Clemson University at: [University Policies: http://www.clemson.edu/administration/student-affairs/student-handbook/universypolicies/index.html](http://www.clemson.edu/administration/student-affairs/student-handbook/universypolicies/index.html).

Academic Integrity:

As members of the Clemson University community, we have inherited Thomas Green Clemson's vision of this institution as a "high seminary of learning." Fundamental to this vision is a mutual commitment to truthfulness, honor, and responsibility, without which we cannot earn the trust and respect of others. Furthermore, we recognize that academic dishonesty detracts from the value of a Clemson degree. Therefore, we shall not tolerate lying, cheating, or stealing in any form.

A simple definition of plagiarism is when someone presents another person's words, visuals, or ideas as his or her own. The instructor will deal with plagiarism on a case-by-case basis. The most serious offense within this category occurs when a student copies text from the Internet or from a collective file. This type of academic dishonesty is a serious offense that will result in a failing grade for the course as well as the filing of a formal report to the University.

See the [Undergraduate Academic Integrity Policy](#) website for additional information about academic integrity and Clemson procedures and policies regarding scholastic dishonesty.

Engagement activities fall under the provisions of our campus's academic honesty policy. Students must not engage in academic dishonesty while participating in in-class engagement activities. This includes but is not limited to answering polling questions while not physically in class, looking at other students' devices while answering live questions, or using more than one ExpertTA account at a time.

Title IX:

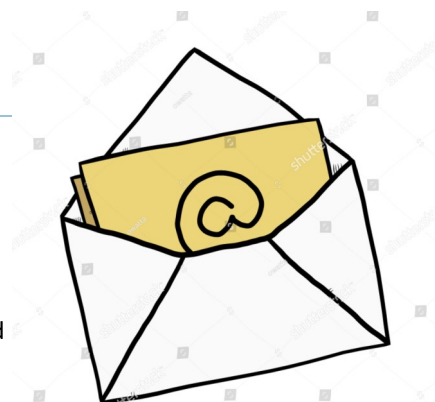
Clemson University is committed to a policy of equal opportunity for all persons and does not discriminate on the basis of race, color, religion, sex, sexual orientation, gender, pregnancy, national origin, age, disability, veteran's status, genetic information or protected activity in employment, educational programs and activities, admissions and financial aid. This includes a prohibition against sexual harassment and sexual violence as mandated by Title IX of the Education Amendments of 1972. This policy is located at <http://www.clemson.edu/campus-life/campus-services/access/title-ix/>. Ms. Alesia Smith is the Clemson University Title IX Coordinator, and the Executive Director of Equity Compliance. Her office is located at 110 Holtzendorff Hall, 864.656.3181 (voice) or 864.656.0899 (TDD).

"My investment of time, as an educator, in my judgement is best served teaching people how to think about the world around them. Teach them how to pose a questions, how to judge what one thinks is true versus another. What the laws of physics say."

Neil deGrasse Tyson

Email Communication:

Because of privacy regulations, University faculty and staff may email students only through Clemson email. Therefore, you must use your Clemson email account in this course for all email communications. Check your Clemson account at least five times per week for important messages. You will want to have your canvas announcement forwarded to your email or check your Canvas messages with a frequency of 5 times per week. Please make sure that your emails are professional in nature.



Student Disability Services:

Student Disability Services coordinates the provision of accommodations for students with disabilities in compliance with Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1990.

Reasonable and specific accommodations are developed with each student based on current documentation from an appropriate licensed professional. All accommodations are individualized, flexible, and confidential based on the nature of the disability and the academic environment. Housing accommodations for a disability or medical condition are also coordinated through this office.

Visit the [Student Disability Services](#) website for location, contact information, as well as official policies and procedures. To learn more information or request accommodations contact Student Disability Services (SDS) at sds@clemson.edu or [864.656.6848](tel:864.656.6848) or visit SDS's website: <http://www.clemson.edu/campus-life/campus-services/sds/about.html>. It is expected that the student will test in the proctor center.

Academic Support Services:

Students may access a variety of academic support services to support your learning in the online classroom. Here are links to services available:

Academic Success Center <http://www.clemson.edu/asc/staff.html>

The Writing Center <http://www.clemson.edu/centers-institutes/writing/>

Clemson Online Library Guides <http://libguides.clemson.edu/distanced>

Online Library Resources <http://www.clemson.edu/library/>

CCIT (Tech Support) http://www.clemson.edu/ccit/help_support/ or CCIT (Tech Support) email:

ithelp@clemson.edu

Academic Advising <http://www.clemson.edu/academics/advising/index.html>

Registrar <http://www.registrar.clemson.edu/html/indexStudents.htm>

Copyright Notice:

The materials found in this online course are strictly for the use of students enrolled in this course and for purposes associated with this course; they may not be retained or further disseminated. Clemson students, faculty, and staff are expected to comply fully with institutional copyright policy as well as all other copyright laws.

Available Assistance:

In addition to the instructor's availability outside of regular class time, there are other opportunities for students to get help on course materials.

Tutoring Information: This course is supported by the Academic Success Center tutoring program. The ASC tutors have completed and done well in this course, and they understand the concepts well enough to help you work through questions you have. For more information visit <https://www.clemson.edu/asc/courses/tutoring/index.html>.

Additional Course Support: If you discover that you would like additional support to meet your success goals for this course, contact the Academic Success Center using their "Request for Course Assistance" form (<http://www.clemson.edu/asc/courses/index.html>).


I am available during office hours to answer any questions that you may have about the course or the course content. Please see me privately if you have special needs or accommodations required in this course.

Inclement Weather:

Any exam that was scheduled at the time of a class cancellation due to inclement weather will be given at the next class meeting unless contacted by the instructor. Any assignments due at the time of a class cancellation due to inclement weather will be due at the next class meeting unless the instructor contacts students. Any extension or postponement of assignments or exams must be granted by the instructor via email or Canvas within 24 hours of the weather related cancellation.

Course Schedule:

Due dates are fixed as per the schedule. On rare instances I will grant more time on an assignment if we have not yet covered the material but please consider this a fixed document of due dates.

| Monday | Tuesday | Wednesday | Thursday | Friday |
|--------------------|-------------------|---------------------------|--|-----------------------------|
| August 19 | 20 No class | 21 | 22 Ch 1 | 23 |
| 26 P2A | 27 CH 2 | 28 P2B | 29  Ch 3 | 30 HW 1 due HW 3 due |
| September 2 P3A | 3 Ch 2 | 4 FCI due P4A | 5 Ch 4 | 6 HW 2 due |
| 9 P4B | 10 Ch 4 | 11 Ptest1 | 12 CAR1 | 13 HW 4 due |
| 16 | 17 Test 1 | 18 P5A | 19 Ch5 | 20 HW 5A |
| 23 | 24 Ch 5 | 25 P6A | 26 Ch6 | 27 HW 5 due |
| 30 P6B | October 1 Ch 6 | 2 EC Tablecloth Ptest2 | 3 CAR2 | 4 HW 6 due |
| 7 | 8 Test 2 | 9 EC Article P7A | 10 Ch 7 | 11 HW 7 due |
| 14 | 15 | 16 P8A | 17 Ch 8 | 18 HW 8 due |
| 21 P8B | 22 Ch 8/9 | 23 EC FORK P9A | 24 Ch 9/10 | 25 HW 9 due |
| 28 P10A | 29 Ch 10 | 30 EC EGG Ptest3 | 31 CAR3 | November 1 HW 10 due |
| 4 | 5 Test 3 | 6 EC Rube P11A | 7 Ch 11 | 8 HW 11 due |
| 11 P12A | 12 Ch 12 | 13 EC Angular P13A | 14 Ch 12/13 | 15 HW 12 due |
| 18 | 19 Ch 13 | 20 EC RUSH Ptest4 | 21 CAR4 | 22 HW 13 due |
| 25 | 26 Test 4 | 27 | 28 | 29 |
| December 2 | 3 Ch 14 | 4 FCI due | 5 EC Survey EC Straw Ch15 | 6 HW 14 due HW 15 due |

September 3: Last day to drop a class or withdraw from the University without a W grade

October 29: Last day to drop a class or withdraw from the University without final grades

December 6: All homework grades finalized at 11:59 pm

Finals given the week of December 9-13:.



E-learning day – complete the assignment under participation