

# PHYS 2080: General Physics II

Class Meeting: TTH 8:00 am to 9:15 am Section 002 (CRN10840) in Daniel 100B  
TTH 9:30 am to 10:45 am Section 002 (CRN10840) in Daniel 100B

Office Hours: M10:00 am to noon and Th 11 am to 2:00 pm  
Office hours are tentative and subject to change and are updated weekly on the Canvas home page

## Course Description:

**PHYS 2080 General Physics II 3 (3)** Continuation of PHYS 2070. Covers such topics as electricity, magnetism, electromagnetic waves, optics, and modern physics. Credit for a degree will be given for only one of PHYS 2080 or 2210. Prerequisites or Concurrent Enrollment: MTHS 1020 or MTHS 1040 or MTHS 1050. PHYS 2070.

## 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 the 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 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, a paper review will serve as a capstone assignment. This assignment will allow the student to pick a technology related to sports. The article 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.

## 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.
- An iClicker Reef account can be attained by downloading the mobile app via the App Store or Google Play, or by visiting the [iClicker Reef student website](#). A two week free trial is offered after which point you will have to purchase the app. A one semester subscription to REEF costs the student **\$14.99**, a one year subscription costs **\$23.99**.

## 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 16: Temperature and Heat

Zeroth law of Thermodynamics, Temperature Scales, Thermal expansion, Heat and Mechanical Work, Conduction, Convection and Radiation

### Topic 17: Phases and Phase Changes

Ideal Gas, Kinetic Theory, Latent Heat, Phase Changes

### Topic 18: Laws of Thermodynamics

Zeroth, First, Second and Third Laws of Thermodynamics, Thermal processes, Heat Engines

### Topic 19: Electric Charges, Forces and Fields

Electric Charge, Insulators and Conductors, Coulomb's Law, Electric Field Lines, Flux and Gauss's Law

### Topic 20: Electric Potential And Electric Potential Energy

Electric Potential And Electric Potential Energy, Energy Conservation, Point Charges, Equipotential surfaces and electric field, capacitors and dielectrics

### Topic 21: Electric Current and DC circuits

Electric Current, Resistance, Ohm's Law, Energy and power in circuits, resistors and capacitors in series and parallel, Kirchhoff's Laws

### Topic 22: Magnetism

Magnetic field, magnetic force on a moving charge, motion of charged particles in a magnetic field, force on a current carrying loop, magnetic torque, ampere's law, solenoids

### Topic 23: Magnetic Flux and Faraday's Law of Induction

Induced EMF, magnetic flux, Faraday's Law of Induction, Lenz's Law, generators and motors, transformers

### Topic 25: Electromagnetic waves

Properties of EM waves, production of EM waves, EM spectrum, energy and momentum of EM waves, polarization

### Topic 26: Geometric Optics

Reflection of Light, forming images with a plane mirror, spherical mirrors, ray tracing and mirror equation, refraction of light

### Topic 28: Physical Optics: Interference and Diffraction

Superposition and interference, Young's two slit experiment, interference in reflected waves, diffraction, diffraction gratings

### Topic 29: Relativity

Postulates of Special Relativity, relativity of time, time dilation, relativity of length and length contraction, relativistic addition of vectors, relativistic momentum, relativistic energy

### Topic 30-32: Quantum, Atomic and Nuclear Physics

Blackbody Radiation and Quantized Energy, photoelectric Effect, Compton effect, wave-particle duality, Heisenberg Uncertainty Principle, Atomic models, Atomic Hydrogen Spectrum, Bohr's Model, Quantum Mechanical Hydrogen Atom, Atomic Radiation, Radioactivity, Half-Life and Radioactive Dating, Nuclear Fission and Fusion, Elementary Particles

## 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 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 worth 20% of your course grade. Each homework is weighted the same. 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 04/24/2019 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 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 regardless of how many questions are posed. 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.

## 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 MCS. These assignments are located through Canvas as quizzes and as Expert TA 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:

PHYS 2080 TTH, 8:00-9:15 am Final Exam in regular class Friday, May 1, 7-9:30pm

PHYS 2080 TTH, 9:30-10:45am Final Exam in regular class Wednesday, April 29, 8-10:30am

## 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.

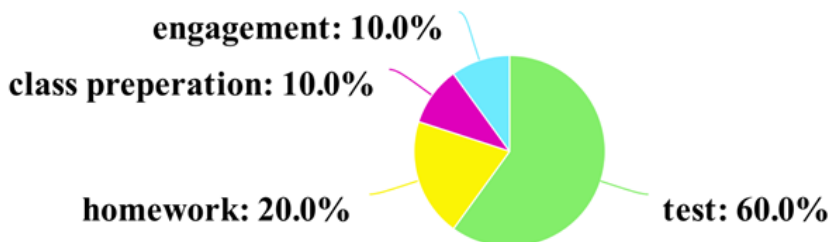
## Determination of Final Grade:

Letter grades are awarded as shown below. Extra Credit adds for a total of 1% above your final course grade. No further changes to grades will be made after the last day of class. Grade distribution is as follows:

4 highest test grades	60%
Engagement	10%
Class Prep	10%
Homework	20%
Extra Credit	1%
<hr/>	
Total	100%

The following scale will be used:

- A: 90% or higher
- B: 80% to 89.99%
- C: 70% to 79.99%
- D: 60% to 69.99%
- F: 0-59.99%



## iClicker Reef:

I will be using iClicker Cloud this semester to conduct quizzes in class. This will help me understand what you know and give everyone a chance to participate in class. This will also give you feedback on how well you are comprehending course concepts, help you master the challenging material in this class, and allow you to review material after class. You are required to bring a device to participate in clicker sessions during class. I will be allowing the use of iClicker Reef on a smartphone, tablet or laptop.

It is your responsibility to properly register your iClicker Reef device in a timely fashion. We will be using them for credit on the first Tuesday of class. It is also your responsibility to regularly check your iClicker grades for any discrepancies and bring them to my attention quickly.

Regardless of which device you use in class, you must create an iClicker Reef account—or use your existing Reef account if you already have one—to ensure that your grades sync to my iClicker gradebook. You can do this by downloading the mobile app via the App Store or Google Play, or by visiting [iclicker.com](http://iclicker.com).

*Then, you must connect your Reef account within our learning management system.* To do this, you must navigate to the iClicker Reef registration link in Canvas, click the link, then sign into your Reef account from the window that opens. This will automatically add our class to your Reef account. It is also recommended that you enter your Clemson email (without the g ex. [amyj@clemson.edu](mailto:amyj@clemson.edu)) accurately in the Student ID field of your Reef profile.

Upon signing up with iClicker Reef, you will have a 2 week free-trial period. After that point, you will need to purchase a Reef subscription (\$14.99 for 6 months) if you want to participate in iClicker sessions with your mobile device, tablet, or laptop.

[Click here to learn about your options for purchasing a Reef subscription.](#)

iClicker support is found by visiting [iclicker.com/support](http://iclicker.com/support) at any time. If you continue to experience issues, please contact iClicker support via phone (866.209.5698 ) or email ([support@iclicker.com](mailto:support@iclicker.com)). Live support is available Monday - Thursday from 9AM - 11PM, ET and Friday from 9AM - 9PM, ET.

## 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



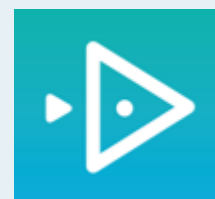
Expert TA purchased  
through Canvas  
\$32.50



Download OpenStax  
Urone and Hinrichs  
College Physics  
FREE



Vernier Logger Pro 3



[iClicker REEF](#)

## 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).

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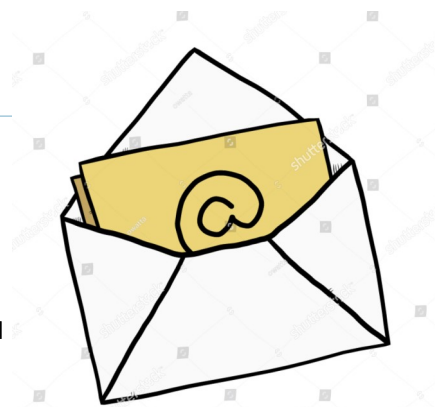
*“My investment of time, as an educator, in my judgement is best served teaching people how to think about the world around them. Teach them how to pose a questions, how to judge what one thinks is true versus another. What the laws of physics say.”*

*Neil deGrasse Tyson*

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

[ithelp@clemson.edu](mailto: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
January 6	7 No class	8	9 Ch 16	10
13	14 Ch 16	15 P17A	16 Ch 17	17 HW 16 due
20 MLK Jr.	21 P17B Ch 17	22 MCS due P18A	23 Ch 18	24 HW 17 due
27 Ptest1	28 Review	29 Thermometer	30 Ch 16-18 Test 1	31 HW 18 due
February 3 P19A	4 Ch 19	5 P19B Battery	6 Ch 19	7 HW 19 due
10 P20A	11 Ch 20	12 P20B Bend Water	13 Ch20	14 HW 20 due
17 P21A	18 Ch 21	19 Ptest2	20 Ch 22	21 HW 21 due
24	25 Review	26	27 Ch 19-21 Test 2	28
March 2 P22A & P22B	3 Ch 22	4 P23A Ferrofluid	5 Ch 23	6 HW 22 due
9 P25A	10 Ch 23/25	11 P25B WorldofEnergy	12 Ch 25	13 HW 23 due
16 Spring Break	17 Spring Break	18 Spring Break	19 Spring Break	20 Spring Break
23 Ptest3	24 Review	25 Speed of Light	26 Ch 22, 23, 25 Test 3	27 HW 25 due
30 P26A	31 Ch 26	April 1 P26B	2 Ch 26/28	3 HW 26 due
6 P28A	7 Ch 28	8 Science Article	9 Ch 29	10 HW 28 due
13 Ptest4	14 Review	15 Evaluation	16 Ch 26, 28, 29 Test 4	17 HW 29 due
20	21 Ch 30/31	22 MCS due	23 Ch 31/32	24 HW 30-32 due

Jan 22: Last day to drop a class or withdraw from the University without a W grade

Mar 13: Last day to drop a class or withdraw from the University without final grades

Apr 24: All homework grades finalized at 11:59 pm

Finals given the week of April 29-May 3:

PHYS 2080 TTH, 8:00-9:15 am Final Exam in regular class Friday, May 1, 7-9:30pm

PHYS 2080 TTH, 9:30-10:45am Final Exam in regular class Wednesday, April 29, 8-10:30am