

PHYS 2070: General Physics I

Class Meeting: TTH 11:00 am to 12:15 pm Section 001 (CRN 10801) Tillman 130
Office Hours: by appointment via zoom. Schedule an appointment here: <https://calendly.com/clemsonamy>



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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.

Course Modality:

This is an in-person course. Course attendance is expected. If we need to move to an online modality, you will be emailed assignments and we will work through zoom. Material covered in class will be posted for review at a later date.

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.

Attendance Policy:

The academic resources of Clemson University are provided for your intellectual growth and development, and class attendance is critical to your education. Therefore, you should attend scheduled courses regularly to attain your academic goals. In the event of an emergency or illness, make contact with me, preferably before a class or an exam takes place. For an absence to be considered an excused absence, use the Notification of Absences form in Canvas to directly communicate with the instructor. If you are not sure where that is, see this [help sheet](#).

For any student asked to quarantine/isolate because of exposure to the virus, inform me through the Notification of Absences form, so that I know you will be online and can support your learning in the class. You will also need to discuss with me any make-up work if you are absent. We should stay in touch! Since this is an in-person course, you are expected to return to in-person attendance once cleared by the University or once your illness/emergency is past.

Please be aware that notification of illness / emergency / quarantine must be received within one week of the event, and you may be asked to provide documentation. Documentation may include a notice from the university regarding quarantine, or confirmation that you had a doctor's appointment (whether in person or virtually).

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 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.

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.

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 for office hours to answer any questions that you may have about the course or the course content. Schedule an appointment here: <https://calendly.com/clemsonamy>. Please see me privately if you have special needs or accommodations required in this course.

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.

Specific COVID-19 related information for in – person classes:

While on campus, face coverings are required in all buildings and classrooms. Face coverings are also required in outdoor spaces where physical distance cannot be guaranteed. Please be familiar with the additional information on the Healthy Clemson website, such as the use of wipes for in-person classes. If an instructor does not have a face covering or refuses to wear an approved face covering without valid accommodation, students should notify the department chair. If a student does not have a face covering or refuses to wear an approved face covering without valid accommodation, the instructor will ask the student to leave the academic space and may report the student's actions to the Office of Community & Ethical Standards as a violation of the Student Code of Conduct. If the student's actions disrupt the class to the extent that an immediate response is needed, the instructor may call the Clemson University Police Department at 656-2222.

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 or moved online. The instructor will contact you with further information. 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.

Prepare to do your BEST

- Preview lecture notes and skim through the text for the material that will be covered prior to viewing it. Education research shows that we have to be exposed to material three times before it begins to sink in.
- Blank lecture notes can be printed from Canvas prior to lecture. Additionally these notes may be annotated on your tablet. If you prefer to take notes by hand that is fine.
- 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.
- Watch each day's lecture with your equation sheet and calculator ready to solve problems...and actually use them.
- Even though there is no grade associated with the worksheets, it is highly recommended that you work through them BEFORE looking at the solutions. The key to this class is PRACTICE.
- 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.
- Tests are open-note, open-book. This DOES NOT mean that the tests are easy. You will have to study diligently to get good grades on the exams.
- The online text is not directly linked in order to what we cover in the class.
- Ask questions (ASC, office hours, friends) freely.

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

Reflection:

Reflection assignments are 10% of your course grade. Assignments are due at 11:59 pm on the day indicated in the schedule. These assignments focus on the metacognitive nature of learning. These assignments are designed to assist the student in learning how to learn.

Exams:

There will be five exams during the semester and one final exam. Each of the six exams is worth 10% of your final course grade with the lowest of the 6 exam grades being dropped which makes the five regular exam and the final exam worth a total of 50% 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 with Webcam. 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.

You may use a calculator, notes, equation sheet and textbook during the tests. You will also want several blank sheets of scratch paper. You may not use any internet based devices during the exam. The test will be administered through Canvas and you can take the exam in the classroom or find a quiet place to take the exam.

Homework:

The 15 homework assignments are 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 **04/23/2021** at 11:59 pm. One homework grade is dropped. 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.

Clickers:

Clicker grades are 20% of your final class grade. **Each clicker grade (including the CLASS and FCI grades) is worth the same amount of credit (regardless of the number of raw points).** The lowest 4 clicker grades are dropped. Each question is graded as 60% credit for participation and 40% credit for correctness.

Clicker Makeup:

The 4 lowest (or missed) clicker grades will be dropped. If you miss class due to university excused absences or illnesses and notify the instructor through the Notification of Absences form in Canvas, you will have an opportunity to make up clicker grades. In order to take advantage of this, you must complete the Makeup Clicker assignment under the Assignments tab in Canvas.

Final Examination:

Your final exam is Wednesday, April 28th from 3 PM to 5:30 PM. You will have 2.5 hours to take the exam. It is open-note, open-book as the other regular exams are. There are 35 questions on the exam which is cumulative. While there are no exemptions in this course, you may consider using the final exam as your dropped exam.

Extra Credit:

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

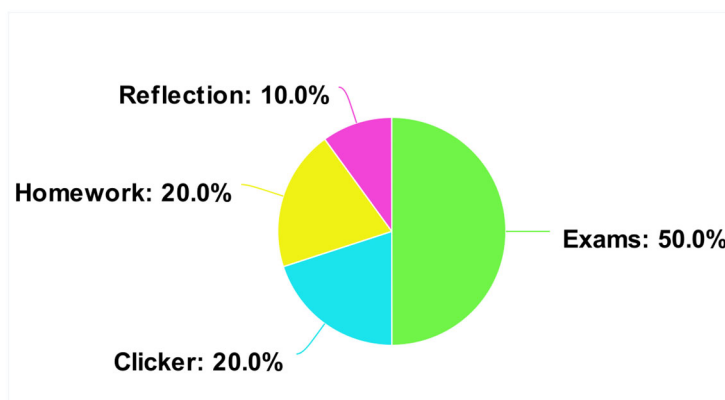
Determination of Final Grade:

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:

| | |
|----------------|-------------------------------|
| 5 test & final | highest 5 grades at 10% = 50% |
| Clicker | 20% |
| Homework | 20% |
| Reflection | 10% |
| Extra Credit | 1% |
| <hr/> Total | <hr/> 101% |

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%



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**

- Respondus must be installed through the Clemson University offered download.
- Calculator (Any scientific calculator is fine.)
- [Adobe Reader \(free\)](#) or [Adobe Creative Cloud Acrobat \(free through Clemson\)](#)
- iClicker Reef which is **\$15.99** per semester per student.
- Ancillary information (texts, videos, audio, slides, notes) is provided in my Canvas course.

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.

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) 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 (\$15.99 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 at any time. If you continue to experience issues, please contact iClicker support via phone (866.209.5698) or email (support@iclicker.com). Live support is available Monday - Thursday from 9AM - 11PM, ET and Friday from 9AM - 9PM, ET.

Make Sure you Have These



Expert TA purchased through Canvas
\$32.50



Download OpenStax
Urone and Hinrichs
College Physics
FREE



[iClicker REEF](#)
\$15.99

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:

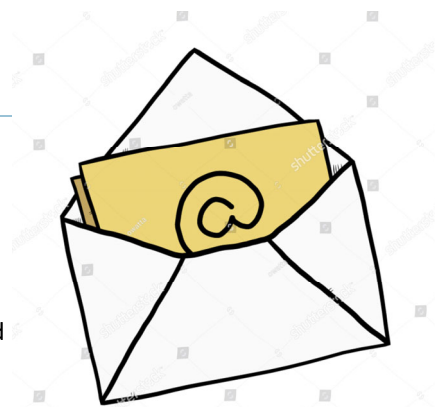
Clemson University is committed to a policy of equal opportunity for all persons and does not discriminate on the basis of race, color, religion, sex, sexual orientation, gender, pregnancy, national origin, age, disability, veteran’s status, genetic information or protected activity in employment, educational 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.



Safe Campus Environment:

Clemson University is committed to providing a safe campus environment for students, faculty, staff, and visitors. As members of the community, we encourage you to take the following actions to be better prepared in case of an emergency:

- a. Ensure you are signed up for emergency alerts (<https://www.getrave.com/login/clemson>),
- b. Download the Rave Guardian app to your phone (<https://www.clemson.edu/cusafety/cupd/rave-guardian/>)
- c. Learn what you can do to prepare yourself in the event of an active threat (<http://www.clemson.edu/cusafety/EmergencyManagement/>)

Internet Connection Issues:

If you have a poor internet connection, please email ithelp@clemson.edu and inquire about a free hotspot.

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-l@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) <http://www.clemson.edu/asc/staff.html>

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

[Clemson Online Library Guides](http://libguides.clemson.edu/distanceed) <http://libguides.clemson.edu/distanceed>

[Online Library Resources](http://www.clemson.edu/library/) <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) <http://www.clemson.edu/academics/advising/index.html>

[Registrar](http://www.registrar.clemson.edu/html/indexStudents.htm) <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.

Phys 2070 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.

| | | | | |
|-------------------|----------------------------------|------------------|----------------------------------|---------------------------|
| January 4 | 5 | 6 | 7 FCI Topic 1 | 8 |
| 11 | 12 CLASS Clicker 1 -Topic 2 | 13 Reflection 1 | 14 Clicker 2 -Topic 15 | 15 HW 1 due HW 2 due |
| 18 MLK Jr | 19 Test 1 Topics 1, 2, 15 | 20 Reflection 2 | 21 Clicker 3 -Topic 3 | 22 HW 15 due |
| 25 EC STRAW | 26 Clicker 4 -Topic 3 | 27 Reflection 3 | 28 Clicker 5 -Topic 4 | 29 HW 3 due |
| February 1 | 2 Clicker 6 -Topic 4 | 3 Reflection 4 | 4 Clicker 7 -Topic 4 | 5 HW 4 due |
| 8 EC TOPIC | 9 Test 2 Topics 3, 4 | 10 Reflection 5 | 11 Clicker 8 -Topic 5 | 12 HW 5 due |
| 15 EC TABLECLOTH | 16 Clicker 9 -Topic 5 | 17 Reflection 6 | 18 Clicker 10 -Topic 6 | 19 HW 6 due |
| 22 | 23 Clicker 11-Topic 6 | 24 Reflection 7 | 25 Clicker 12 -Topic 7 | 26 HW 7 due |
| March 1 | 2 Test 3 Topics 5, 6, 7 | 3 Reflection 8 | 4 Clicker 13 -Topic 8 | 5 HW 8 due |
| 8 EC FORK | 9 Clicker 14 -Topic 9 | 10 Reflection 9 | 11 Clicker 15 -Topic 9/10 | 12 HW 9 due |
| 15 SPRING BREAK | 16 SPRING BREAK | 17 SPRING BREAK | 18 SPRING BREAK | 19 SPRING BREAK |
| 22 EC TOPIC | 23 Clicker 16 -Topic 10 | 24 Reflection 10 | 25 Clicker 17 -Topic 11 | 26 HW 10 due HW 11 due |
| 29 | 30 Test 4 Topics 8, 9, 10, 11 | 31 Reflection 11 | April 1 Clicker 18 -Topic 12 | 2 HW 12 due |
| 5 EC ANGULAR | 6 Clicker 19 -Topic 13 | 7 Reflection 12 | 8 Clicker 20 -Topic 13 | 9 HW 13 due |
| 12 EC TOPIC | 13 FCI Clicker 21 -Topic 14 | 14 Reflection 13 | 15 CLASS Clicker 22 -Topic 14 | 16 HW 14 due |
| 19 EC COURSE EVAL | 20 Test 5 Topics 12, 13, 14 | 21 Reflection 14 | 22 Clicker 23 -REVIEW | 23 |

Jan 20: Last day to drop a class or withdraw from the University without a W grade

Mar 12: Last day to drop a class or withdraw from the University without final grades

Apr 23: All homework grades finalized at 11:59 pm

Final exam: Wednesday, April 28th from 3 PM to 5:30 PM