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Physics 101: Essentials of Physics

Instructor

Prof Eric Corwin

374 Willamette Hall

Office Hours: Wed 2-3pm, Wil 374
ecorwin@uoregon.edu

American English Institute Instructor

Jennifer Rice, Instructor, UO AEI jar@uoregon.edu

Lectures

MW 4:00 – 5:20 pm, 100 Willamette Hall

Assistants

This course has several people assisting it – make use of them!

Caleb Holt, GTF cholt@uoregon.edu, Office Hours: Thursday 2-3pm, Wil 74

Mohamad Nourikorbaslo, GTF mnourik2@uoregon.edu, Office Hours: Wednesday 10-11am, Wil 271

Kyle Welch, SLP GTF kwelch@uoregon.edu, Office Hours: Thursday 2-3pm, Wil 373

Office Hours

Office hours may change during the term. There are lots of office and drop-in hours! You’re strongly encouraged to come to these, mine as well as the course assistants’, either with specific course-related questions, or just to chat about physics, science, and other general topics. (Note that there is no discussion section for the course.)

Course Description
This course will serve as an introduction to physics, demonstrating how a rich variety of complex natural phenomena can be explained using a framework of fundamental forces and laws that allows us to understand why things happen. Physics often has the reputation of being a “hard” science littered with confusing jargon and mathematics. This course will attempt to undo that reputation and provide you with tools to understand how the world around us works. The course is primarily conceptual in nature, using only simple high school algebra to help illuminate the underlying physical phenomena. Simple numerical and conceptual problems will be assigned in homework sets, and use of a calculator will be helpful but not essential.

Goals for the class include being able to discuss the following questions: What is mass? Energy? Momentum? Angular momentum? How can the natural world be understood and explained?

Textbook

How Things Work, Louis A. Bloomfield

i>clickers

We’ll use “i>clickers,” personal response system that allow real-time polling and assessment in class.

Each enrolled student needs one clicker. Clickers can be purchased at the bookstore, new or used. If you know someone not enrolled in this course, borrowing their clicker for this class will work fine. If this presents a problem please come talk to me, I have a limited number of “i>clickers” to loan out for the term.

You will need to register your clicker by using the i>clicker link in the side menu of Canvas.

Tentative Course Schedule and Reading

Note: All reading should be completed before the start of the week.

Ch 1.1, 1.2, Appendix A, B Introduction to Physics, Skating, Falling Balls

Ch 1.2, 1.3, 2.1 Projectile Motion, Ramps, Seesaws, Wind Turbines
Ch 2.2, 2.3 Wheels, Bumper Cars

Ch 3.1, 3.2, 3.3 Spring Scales, Bouncing, Carousels, Roller Coasters

Midterm, Ch 4.2 Rockets, Space Travel

Ch 5.1, 5.2, 6.1 Balloons, Water Distribution, Garden Watering

Ch 6.2, 6.3, 9.1 Cuve Balls, Airplanes, Clocks

Midterm Ch 9.2, 9.3 Musical Instruments, The Sea

Ch 14.1, 16.1 Sunlight, Nuclear Weapons

Ch 16.3 Medical Imaging, Radiation, Modern Physics

Important Dates

January 11 – Last day to drop without a “W”

January 13 – Last day to add a class

February 21 – Last do to withdraw (drop with a “W”) or change grading option to P/N

March 17 – Final Exam (2:45pm)

Homework

Weekly homework sets will be assigned on Canvas about one week before they are due. Homework is due each Monday by the start of class. Completed sets should be put into the designated In-Box (location: basement of Willamette – directly below our classroom, bottom of stairs and to the right). We will accept late homework no more than 24 hours late (4:00 pm Tuesday in the homework In-Box), but the score will be reduced by 50%. You are encouraged to discuss homework assignments and readings with others, though your “final answers” should be your own. Office hours are an excellent place to discuss homework!

Reading Quizzes

Most of classes will begin with a very short reading and concepts quiz, using your clicker. The quizzes should add incentive to do the assigned reading before
class, and the questions are designed to be easy if you’ve done the reading (they won’t test mastery of the material). Your responses are known only to you and the Instructors. Bring pencil, paper, and (optionally) calculator to every class for these.

Section

Sections are held every Friday. All students are expected to attend and bring a written list of at least three questions that they would like discussed.

Grading

In general, vibrant class participation enhances all students’ learning experiences – one of the motivations for “clicker” usage. However, I consider it overly paternalistic to require attendance. Therefore there will be two possible weightings of the various grade components:

Reading quizzes (RQ): Short, simple clicker questions occasionally at beginning of class

Participation (P): In-class i>Clicker-based polls related to the present topic, scored by participation only, not the accuracy of the response.

Section Participation (SP): Bringing written questions to section.

Homework Assignments (HW)

Midterm Exam 1 (MT1)

Midterm Exam 2 (MT2)

Final Exam (F)

Option 1: RQ/P/SP/HW/MT1/MT2/F = 5/10/5/25/15/15/25 %

Option 2: RQ/P/SP/HW/MT1/MT2/F = 0/0/5/25/20/20/30 %

I’ll grade each student using both options, keeping the higher overall score.

Final Grade: A=88-100%; B=76-87.9%; C=64-75.9%; D=52-63.9%; F<52%.
If necessary, I may apply a curve to achieve a higher average final grade. However, you are guaranteed at least the grade listed here based on your course average. Pass/fail grading option: A passing grade requires at least the equivalent of a C- grade.

Math Diagnostic

The mathematics in this course will be very elementary, as discussed in class, but it is important to be comfortable with these basic numerical skills. Therefore there will be a diagnostic “quiz” to be taken on-line (via Canvas) on basic mathematics. Re-taking the quiz is allowed – you are encouraged to learn from your mistakes, and to see the TAs and me for help. Scoring 75% or higher by the Wednesday of Week 2 is required for continuing in the course. (A score of <75% will automatically result in a failing grade for the course.)

Absences

I realize that it is unavoidable that people will have to miss a few classes (due to illness, for example). Therefore I will rescale the grades of the post-class notes, clicker questions, and reading quizzes such that 90% becomes 100%. (In other words, I will divide each student’s percentage by 0.9, with a ceiling of 100%. If your original score were 75%, the rescaled score would be 83%.) I will not allow “makeup” quizzes, etc. – the point of this policy is to avoid the messes created by these sorts of ad-hoc arrangements.

No Laptops/Phones/Tablets in Class

The use of laptops and phones in class is in general not allowed. Why? Several studies, plus past experience, show that students using laptops in class spend a great deal of time on non-class-related activities (facebook, games, …) and that these distractions negatively impact both learning and grades. This alone isn’t a reason to ban laptops – you’re responsible for your own performance in class. In addition, however, studies have shown that non-class-related laptop use distracts and impacts the learning of other students nearby. (E.g. Fried, C. B. Computers & Education 50, 906-914 (2008).) Plus, students have complained to me about the environment created by their classmates laptop use. Taking notes by hand, by the way, is more effective in cementing concepts in your mind. In summary, laptops are not allowed in class. The only exceptions will be for people with medical needs; please see me if this is the case.
Academic Honesty

Students are expected to abide by university policies on academic honesty, avoiding plagiarism, fabrication, cheating, and academic misconduct. The Student Conduct Code (conduct.uoregon.edu) provides definitions of these terms and explanations of the university policy on the subject. The UO Library also provides a guide to avoiding plagiarism (libweb.uoregon.edu/guides/plagiarism/students/). You are responsible for understanding these regulations and abiding by them. Students should be particularly careful to avoid plagiarism in out-of-class assignments, as well as projects and exams. Academic dishonesty will be dealt with severely, as it is disrespectful to your fellow students and your instructor, as well as being against both university regulations and state laws.

Physics Drop-In Help Center

Free help with any standard math or physics question can be obtained in 147 Willamette Hall. The Drop-In Help Center is staffed 5 days a week and most of the day (hours are posted on the door).

Policy on Missed Deadlines, Significant Absences and Incompletes

Only the following unforeseen and uncontrollable emergency situations are acceptable excuses for missed deadlines:

Documented serious illness/injury;

Documented death in the immediate family.

All of the following are unacceptable – note that they include “personal” as well as “technological” excuses:

Special occasions (e.g. weddings, birthdays, anniversaries etc.)

Work and school conflicts: “I had to work extra hours,” “I have a huge midterm tomorrow in another class…”

Couldn’t get to campus (alarm didn’t ring; missed the bus; etc.)

Being generally “busy” or having “a lot going on right now…”
Forgot or “mixed up” the assignment or due date

No access to computer or printer; assignment completed on computer is “missing,” was accidentally erased, or is inaccessible

If an extraordinary situation arises which will compromise your ability to meet a deadline please come talk to me well in advance of the deadline and we can work something out.

Succeeding in this Course

Plan ahead and start early! The reading assignments are a vital part of this course, and it is important to start reading them early not only to understand the subject matter but to be able to articulate what you don’t understand – in class lectures and discussions will build on your reading experiences. Note that the reading assignments must be done before the days at which their topics are discussed in lecture. In general, it will be crucial to keep up with the course and not fall behind; later topics will build on earlier ones.

Make use of resources. If you have questions about lectures, assignments, readings, or other matters, please visit office hours, or communicate by email. Individual appointments can readily be arranged to accommodate schedule conflicts with the regular office hours. The University’s Academic Learning Services (ALS) center provides a variety of workshops, individual consultations, writing assistance labs, and more to assist UO students. For more information see als.uoregon.edu, or call (541) 346 3226. The University’s Teaching and Learning Center also provides workshops and courses – see tlc.uoregon.edu and tlc.uoregon.edu/learningservices/workshops.html.

Students with disabilities

If there are aspects of the instruction or course design that result in barriers to your inclusion, please notify Prof. Corwin as soon as possible. You are also welcome to contact Disability Services in 164 Oregon Hall, 346-1155.

Soft Matter Physics at the University of Oregon

Research Topics

CorwinLab Research
A Geometric View of Jamming
Fluctuation Dissipation in Non-Equilibrium Systems
2D Friction-driven Granular Flow Mechanics
Granular Optics
Crossover from Ballistic to Brownian Motion
Two-Dimensional Macroscopic Ideal Gas
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