

University Physics I

(Physics 231, CRN 10138)

Welcome to University Physics I at Old Dominion University. This course is intended to give a solid introduction to basic principles of classical mechanics, waves and thermodynamics, to develop problem solving skills, and to prepare university students for professional careers in science and engineering. The emphasis will be to study what is important today and in the future rather than to cover all topics in the traditional syllabus. In this course we shall cover fewer topics, but in greater depth. The course is calculus based.

The course working environment is SCALE-UP (Student-Centered Active Learning Environment for Undergraduate Programs). This environment facilitates active and collaborative learning in a studio-like setting.

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| Co requisite | Math 211 or Math226, or permission of instructor. Math proficiency in the following areas is essential: algebra, trigonometry, vectors and introductory calculus. If you are uncertain about your preparation, consult the instructor. |
| Instructor | Dr. Alexander L. Godunov Office: OCNPS 0219 (Oceanography and Physics) Phone: 683-5805 agodunov@odu.edu Web page: http://www.odu.edu/~agodunov/teaching/phys231_10 |
| Classes | MW 9:00 – 10:50, F 9:00 – 9:50 in Oceanography & Physics, Room 142-144 |
| Course TA | Michael Moore – mmoor057@odu.edu |
| Materials | There are no required textbooks for this class. Students may use any university physics (calculus based) textbook. Recommended textbooks: Understanding Physics by Cummings et al, University Physics by Young & Freedman, 10 th , 11 th , 12 th editions. WebAssign access (required): http://www.webassign.net Clickers: Each student is required to have a clicker for use each day in class. |
| Support resources | <i>Office hours:</i> Wednesday 11:00 – 12:00 in Physics Learning Center, Monday 11:00 – 12:00 in OCNPS 219, and by appointment. <i>Physics learning center:</i> a place where students in all physics courses can get help. The center is staffed by physics faculty and TAs (2 nd Floor Atrium, Physical Sciences Building), www.sci.odu.edu/physics/resources/learning_center.shtml <i>E-mail:</i> The e-mail address is agodunov@odu.edu (have “physics 231” in the subject line). <i>Phone:</i> Feel free to contact the instructor for any urgent questions. |
| Time commitment | Physics 231 is a demanding course and students should allocate sufficient time during the semester to do well in the course (up to 12 hours per week). If you are spending more than 15 hours per week, you should contact the instructor to |

develop a different studying strategy.

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| Course Grades | <p>The final grade is calculated on an absolute scale. There are 100 points possible for this course of which</p> <ul style="list-style-type: none">30 points – Three Midterm Exams40 points – Final Exam10 points – Weekly Quizzes05 points – Class Participation (clickers)10 points – Homework assignments05 points – Laboratory <p>The grading policy is non-competitive and lenient, but there will be no curve. A letter grade is determined only at the end of the term.</p> |
| Class time | <p>Each class period will consist of lectures, interactive discussions, solving problems, and conceptual quizzes (clicker questions). You will often work in groups of three students (“a manager”, “a skeptic”, “a recorder”) to solve problems given in class.</p> |
| Homework | <p>The homework is to be submitted via the web using ‘WebAssign’.</p> <p>The class key is odu 5456 6451.</p> <p>Homework will be set as we progress through the course. One assignment will be due approximately each week, (about 14 assignments). Assignments are due before 21:00 at the WebAssign web site on the indicated date.</p> <p>Each student is required to keep an <u>Assignment Journal</u> in which all assignment problems are to be completed before posting solutions on WebAssign. The journal will be collected, reviewed, and graded by the class TA's.</p> <p>No individual extension of assignment submission dates will be given.</p> <p>Doing the homework problems is one of the best ways to learn the material. Credit for homework is given to encourage practicing and thinking about physics on a regular basis. This credit will influence the final grade for this course.</p> |
| Reading Assignments | <p>For most classes you will be given a reading assignment. You may need to answer a couple reading assignment questions. The reading assignment questions should be submitted online using WebAssign, and will be due just before the class begins.</p> |
| Laboratory | <p>In SCALE UP classes there are no traditional labs. Labs are be integrated with in-class lectures and activities. You do not need to purchase a lab manual.</p> <p>Labs will be done in groups. Some labs may require formal lab reports. To receive a credit for the group report, you must have contributed to the report. If a member of the group does not contribute to the report, that person's name must not appear on the report.</p> |
| Quizzes | <p>Quizzes will be given almost every Friday. A quiz consists of a few short problem-solving and/or conceptual questions. There are no make-up quizzes; however, the lowest two quiz scores will be dropped.</p> |
| Exams | <p>There will be three midterm exams and one final exam. The midterm examinations will be given during the regularly scheduled class periods. All the exams will be</p> |

closed book. The examinations will emphasize the material in lectures and homework assignments. Some material covered in class may be omitted. A typical exam will include problems and questions similar to the homework or discussions in class. Your work should be neat and orderly; with large, clear, and clearly labeled diagrams. Formulas and numbers alone won't do; you must show your work and explain your reasoning to earn full credit on a problem.

All exams are hand-graded. Most credit is given for the correct method or "Theory". It is the responsibility of the student to communicate answers clearly. The final examination is comprehensive. It is mandatory and will be given only at the scheduled time.

The lowest midterm examination score is not counted; the remaining two count for 15 points each.

Regrade: Requests for correction of grading mistakes on exams can be made when the work is returned to you. The requests must be made within four days after getting your grade. Regrade requests should be written. In their request, students must explain why they believe there is a mistake in grading and why they deserve more credit. It is not a plea for more points. However, clerical errors (e.g., addition errors) will be corrected immediately.

No make-up examinations will be given. In case you have a legitimate reason for missing an exam, consult with me before, or within 24 hours after the exam. If you miss a midterm examination for an officially excused reason (documented illness or family emergency, major religious holidays, or official university business) your missed examination score will be replaced with the appropriately scaled score on the portion of the final exam that covers same material as the missed midterm examination.

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| Midterm exams | September 27 th , October 25 th , November 22 nd , 9:00 – 10:20 Oceanography & Physics, Room 142 |
| Final Exam | December 15 th , 2010, 8.30 – 11:30 Oceanography & Physics, Room 142 |
| Course goals | Teach understanding of the basic principles of classical mechanics and waves, teach the qualitative and quantitative thinking skills that can be applied in a broad variety of fields and circumstances. Cultivate individual and collaborative problem solving skills. |
| Course structure | Different people learn in different ways. Therefore this course offers a learning environment with a diversified set of options that you can tailor to your individual learning style. There are class meetings, review sessions, homework assignments, office hours, and many ways to get additional support. |
| Keys to success | What counts in Physics 231 is to understand the underlying concepts. Advanced reading, consistent participation, and timely completion of assignments are the keys to success. If you work regularly and allocate enough time each day to complete the assignments on time and keep up with the course, you will get the most out of the course both intellectually and grade-wise. Two things that |

generally do not work are memorization and cramming to catch up just before the examinations (it will be impossible to assimilate all the material). Use the support resources to clarify the material as soon as you feel unsure about something — the instructor is there to help you.

Expectations

For the most efficient use of time in class – you are expected to be prepared for class by reading the material ahead. Reading ahead requires time and some discipline, but the payoff is considerable: the material will be much easier to understand.

Exams and assignments – you are expected to do your work in a neat way (clear diagrams, equations, explanations and numbers). You must show your work and explain your reasoning to earn full credit on a problem.

Finally, you are expected to ask for help when you feel you do not understand something. Do not wait until the final exam to address any problems with the material, most of the time it will be too late.

Important

In Physics 231, high professional and ethical standards are promoted. Plagiarism and cheating are serious offenses and may be punished by failure on the exam and failure in the course. The academic integrity code is to be maintained at all times.

Collaboration

Collaboration in class, and on homework assignments is strongly encouraged. Because the course is graded on an absolute scale, you will never reduce your grade by helping others — on the contrary, by doing so you will reinforce your own knowledge and improve your performance. Although, before working together or consulting others on any assignments, it is helpful to first tackle the work alone. Activities for which collaboration is not permitted are: examinations, quizzes, and submission of homework assignments.

Course Syllabus

Textbook 1 = Understanding Physics by Cummings et al

Textbook 2 = University Physics by Young and Freedman

| Subject | Textbook 1 | Textbook 2 |
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| 1. Units | Chapter 1 | Chapter 1 |
| 2. Vectors | Chapter 4 | Chapter 1 |
| 3. Motion Along a Straight Line | Chapters 2, 3 | Chapter 2 |
| 4. Motion in Two Dimensions | Chapter 4 | Chapter 3 |
| 5. Newton's Laws of Motion | Chapter 3 | Chapter 4 |
| 6. Applying Newton's Laws | Chapter 6 | Chapter 5 |
| 7. Kinetic Energy and Work | Chapter 9 | Chapter 6 |
| 8. Potential Energy and Energy Conservation. | Chapter 10 | Chapter 7 |
| 9. Momentum, Impulse and Collisions | Chapter 7, 8 | Chapter 8 |
| 10. Rotation | Chapter 11 | Chapter 9 |
| 11. Dynamic of Rotational Motion | Chapter 12 | Chapter 10 |
| 12. Equilibrium and Elasticity. | Chapter 13 | Chapter 11 |
| 13. Gravitation | Chapter 14 | Chapter 12 |
| 14. Periodic Motion | Chapter 16 | Chapter 13 |
| 15. Fluids | Chapter 15 | Chapter 14 |
| 16. Mechanical Waves. | Chapter 17 | Chapter 15 |
| 17. Sound Waves | Chapter 18 | Chapter 16 |
| 18. The First Law of Thermodynamics* | Chapter 19 | Chapters 17 – 19 |
| 19. The Second Law of Thermodynamics* | Chapter 21 | Chapter 20 |

Some topics may be added and some topics omitted at the instructor's discretion, and depending on student's interest and time constraints.