

# Introductory General Physics I

## Physics 111

This course is intended to give an introduction to basic principles of classical mechanics, periodic motion, waves, fluid mechanics and thermal physics. We will study how the motion of an object can be understood and predicted in terms of the forces that are acting on the object. The key objectives of the course include conceptual understanding and developing problem solving skills, so that you would be able to describe simple physical processes in terms of the laws of physics in their mathematical formulation. This course is an important one in preparing university students for professional careers.

<b>Classes</b>	Monday, Wednesday, Friday 11:45 – 14:15 (May 19 <sup>th</sup> – June 27 <sup>th</sup> ) in Oceanography & Physics, Room 142
<b>Instructor</b>	Dr. Alexander L. Godunov Office: OCNPS 219 (Oceanography and Physics) Email: <a href="mailto:agodunov@odu.edu">agodunov@odu.edu</a> Phone: 683-5805 Web: <a href="http://www.odu.edu/~agodunov">www.odu.edu/~agodunov</a>
<b>Prerequisite</b>	Math proficiency in algebra and trigonometry is essential. You will not be able to proceed in the class without some command of this part of mathematics. If you are uncertain about your preparation, consult the instructor. You are required to have completed at least one of Math102M, Math162M, Math166 or an equivalent.
<b>Materials</b>	<u>Recommended textbook</u> : College Physics, Vol. 1, 9 <sup>th</sup> (or 8 <sup>th</sup> ) edition by Young & Geller. If you have a College Physics textbook from another university OR an old copy of College Physics by Young and Geller (any edition 8th or 9th), that is OK. All assignment problems are given you through Mastering Physics so problems at the end of each chapter in each text are not needed. <u>Required</u> (for homework): Mastering Physics: <a href="http://www.masteringphysics.com/">http://www.masteringphysics.com/</a> <u>Required</u> : Physics 111 & 231 Laboratory Manual <u>Highly recommended</u> : Clickers (Turning Point Response Card RF) from the bookstore or elsewhere
<b>Support resources</b>	<i>Blackboard</i> : Lecture notes/slides and exam solutions will be posted on the class Blackboard page <i>Office hours</i> : M, W, F 10:45-11:45 in OCNPS 219 and by appointment. <i>E-mail</i> : <a href="mailto:agodunov@odu.edu">agodunov@odu.edu</a> (have “summer physics 111” in the subject line). <i>Phone</i> : feel free to contact the instructor for any urgent questions.
<b>Class time</b>	Each class period will consist of lectures, interactive discussions, and problem solving. Attendance is highly advisable. If you have to miss a class, it is your responsibility to find out what you missed.
<b>Time commitment</b>	Summer Physics 111 is a highly demanding course and students should allocate sufficient time during the short summer semester to do well in the course.

<b>Course grades</b>	<p>The final grade is calculated on an absolute scale. There are 100 points possible for this course of which</p> <p>30 points – Final Exam</p> <p>42 points – Three midterm exams (14+14+14=42)</p> <p>10 points – Labs (You must receive a passing grade to pass the course)</p> <p>6 points – Quizzes</p> <p>12 points – Homework assignments (Mastering Physics + homework journals)</p> <p>The grading policy is non-competitive and lenient, but there will be <b>no curve</b>. If everyone in the class does well, everyone can get an A.</p> <p>A letter grade is determined only at the end of the term.</p> <p>Grade Requirements (breakpoints)</p> <p>92 ≤ A &lt; 100    88 ≤ A- &lt; 92    83 ≤ B+ &lt; 88</p> <p>77 ≤ B &lt; 83    72 ≤ B- &lt; 77    66 ≤ C+ &lt; 72</p> <p>60 ≤ C &lt; 66    55 ≤ C- &lt; 60    50 ≤ D &lt; 55    F &lt; 50</p>
<b>Homework</b>	<p>The homework is to be submitted via the web using Mastering Physics. The class ID is <b>ODU2014PHYS111</b>.</p> <p>Homework assignments will be set as we progress through the course. One assignment will be given for every chapter.</p> <p><u>Each student is required to keep an Assignment Journal</u> in which all assignment problems are to be completed before posting solutions on Mastering Physics. Solutions in the assignment journal have to follow the structure of “Sample homework solutions”. The journals will be collected, reviewed, and graded. 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. You should start homework early and get help if needed before the due date. <u>No individual extensions of assignment submission dates will be given.</u></p>
<b>Reading Assignments</b>	<p>Because there will be limited time for presenting information in class so it is <b>VITALLY IMPORTANT</b> that you read the appropriate sections of the textbook <b>BEFORE</b> coming to class. I will inform you at the end of each class what the appropriate reading for the next class will be. Some classes may begin with a simple quiz questions about what you have read or you may have a reading assignment quiz on Mastering Physics.</p>
<b>Laboratory</b>	<p>Attendance &amp; participation is required in the laboratory portion of this course. Any student with more than one absence will fail the laboratory and hence the entire course. You must hand in a lab report to get credit for each session. If you cannot avoid missing a lab session, contact the lab instructor in advance. You should bring with you to the lab session a calculator and a copy of the laboratory manual. The lab instructor will detail the format of lab reports and the grading criteria to be applied.</p>
<b>Quizzes</b>	<p>There will be periodic quizzes through the semester (except on exam weeks). There will be no make-up quizzes.</p>

- Midterm exams** There will be three midterm exams. The midterm examinations will be given during the regularly scheduled class periods on May 28<sup>th</sup>, June 6<sup>th</sup>, and June 16<sup>th</sup>. All the exams will be closed book.
- The examinations will emphasize the material in lectures and homework assignments. Some material covered in class may be omitted. Your work should be neat and orderly; with large, neat, 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.
- No make-up examinations will be given. In case you have a legitimate reason for missing an exam, consult with me before, or at least 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.
- Requests for correction of grading mistakes on exams can be made when the work is returned to you. The requests must be made within two days after getting your grade. 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. However, clerical errors (e.g., addition errors) will be corrected immediately.
- Final Exam** June 27<sup>th</sup>, Thursday 11.45 – 14:45  
Oceanography & Physics, Room 142  
The final examination is comprehensive. It is mandatory and will be given only at the scheduled time.
- Keys to success** What counts in Physics 111 is to understand the underlying concepts and problem solving. 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.
- You are expected to read the sections in the textbook that are covered in class. You should spend at least 1 hour each class day reading your text book.
- 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.

**Professional Integrity**

In Physics 111, 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.

**Policy on class disruption**

Policy on class disruption: Class disruption will not be tolerated. Students attending class have the right to a professional, quiet and amiable learning environment free of disruption. Disruptive behavior may include but is not limited to: persistent late arrivals or leaving early in a manner that disrupts the regular flow of the class, talking while the instructor is talking, speaking in class without first obtaining recognition and permission to speak, use of electronic equipment such as cell phones, computers, MP3 players, etc. in a manner that disrupts the class.

**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

### **Mechanics**

1. Models, measurements and vectors
2. Motion along a straight line
3. Motion in a plane
4. Newton's laws of motion
5. Application of Newton's laws
6. Circular motion and gravitation
7. Energy
8. Momentum
9. Rotational motion
10. Dynamics of rotational motion

### **Periodic motion, waves and fluids**

11. Periodic motion
12. Mechanical waves and sound
13. Fluids

### **Thermodynamics\***

14. Temperature and heat\*
15. Thermal properties of matter\*
16. The second law of thermodynamics\*

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

\*Indicates "optional" sections (if we get that far)

**Checklist 1: Things to have**

- ✓ A textbook
- ✓ Access to Mastering Physics
- ✓ An assignment (homework) journal
- ✓ Laboratory manual
- ✓ A clicker
- ✓ Time and determination

**Checklist 2: Things to do**

- ✓ Read the textbook or lecture notes (before and after) till you understand
- ✓ Attend the class and really work through the class time
- ✓ Do homework and start doing it well before the last hour
- ✓ Keep the assignment (homework) journal and follow the instructions
- ✓ Talk to your instructor when needed.

**Checklist 3: Things NOT to do**

- ✓ Don't cheat.  
You learn nothing by cheating on homework and homework is the primary way that you learn physics.
- ✓ Don't plug and chug.  
Physics is not about crunching numbers

**Journals will be a vital part of your education**

As a reminder, all of your work, including your homework, must be your own work. This means that it must not be copied from other students, copied from another website, or etc. Most importantly, many homework problems later make an appearance on tests in similar forms, so if you do not take the time to work through them now, you will only hurt your grades on quizzes and exams.

Each student is required to keep an Assignment Journal in which all assignment problems are to be completed before posting solutions on Mastering Physics. A notebook or a single folder will work fine. Journals are to be neatly handwritten.

Instructions for solving problems in homework assignment journals (as well as exams and quizzes)

1. Name the type of physics most likely related to the problem in hand. Draw a diagram if needed.
2. Write down the "basic" equations for the physics of the problem.
3. Simplify (when possible) the "basic" equations using given data and conditions.
4. Solve the "adjusted" equation for the unknown(s) using algebra, trigonometry and calculus.
5. Achieve a numerical answer using your symbolic solution and the proper units.
6. Step back, and evaluate your answer in terms of units, dimensions, and most importantly, common sense.

At the end of every assignment you should have answers to the questions:

1. What was the "muddiest" point in this chapter?
2. What was the most difficult problem in this assignment and why?

**A flowchart for studying physics (for every chapter)**

