Objective: Demonstrate a practical understanding of the basic physical concepts of classical mechanics, fluids, waves and acoustics by: 1. Methodically solving problems in theory on paper, in computer models, or using mathematical animations, and 2. Investigating problems in practice during physical demonstrations, laboratories, or real life experience. See last page for more detailed learning outcomes of this course.

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The publisher’s web site (Wiley Plus) is at www.wileyplus.com
Ensure you Register at www.wileyplus.com as soon as possible. There is homework due Thursday.

Grading: Your final course grade will be calculated using the following percentages:
- Homework 07%
- Homework Notebook 03%
- Laboratories 05%
- Quizzes 11%
- Hour Exams (2@ 13% each) 26%
- Midterm Exam 18%
- Final Exam 30%

Your progress grade will be calculated using the following percentages:
- Homework 07%
- Homework Notebook 03%
- Laboratories 05%
- Quizzes 11%
- Hour Exams (22% each) 44%
- Midterm Exam 30%

Letter grades are defined as normal: A > 90%, B > 80%, C > 70%, D > 62.5%

The Midterm exam (take-home exam and in-class) are made by me, but you will submit all your work!
The Final exam is a common three hour multiple choice final exam prepared by department committee.

Any student who fails the final exam will receive a grade of “F” for their final course grade.

Do not assume your current grade exempts you from applying yourself to any exam.
Naval Officers always do their best; there is never an excuse for lack of effort.
Classroom etiquette:
• Drinks are permitted, **food is not. [This is the Dean’s Rule, so ensure you follow it!]**
• If you need to use the *head, do so without interrupting class; no need to ask permission.*
• **No sleeping. If you are tired, feel free to stand in the back of the classroom.**
• **No Electronics (cell phones, laptops, iPad/iPod, etc.) may be used by students in classroom.**

Required Materials: You should have the following materials as of the second class session: One 3 ring notebook for handouts/notes, one 3-ring notebook for homework, and one lab notebook (up to you which style), colored pencils, highlighter, a rolling ruler, and a calculator. The colored pencils will help when drawing free body diagrams or other drawings with many different components. **You SHALL bring your book, 3 ring notebook, homework notebook, and calculator each day of class! Lab days you must bring your laptop and lab notebook to lab also!**

Reading assignments: Read over the material that is going to be covered in class *before* the appropriate lecture. Looking at the syllabus and seeing where we left off from last class will clue you in on what to review before class. You are responsible for all reading assignments, *even if not covered in lecture.*

Homework:  **Homework is mandatory!** It is due 01:00 on Thursday’s and Monday’s; 50% reduction if late. You must demonstrate proficiency in technical subjects by applying your knowledge to solving problems. **To support development of this skill, you will regularly submit homework via the Wiley-Plus Web Site and on paper.** Failure to turn in all assignments can result in my invoking discretion to lower your final grade based on lack of effort in addition to Extra Military Instruction.

The point of homework is not achieving a correct or incorrect answer. You should strive to refine your problem solving and reasoning skills. Physics is more about why answers are right than the right answers themselves.

Keep a homework notebook and discipline yourself to use the following problem solving method. **I will collect and grade homework notebooks a few times during the semester.** The numbers in parenthesis represent the approximate grading weight for each step of the method and should give you a guide for how much time to spend performing that step.

1. Read the problem. Reread it if necessary. (5%)
2. Write down the information that is “given.” (5%)
3. Write down what is to be “found.” (5%)
4. Draw a picture or sketch. (20%)
5. Write down the fundamental physical relationship necessary to solve your problem. (40%)
6. Perform the mathematics (algebra, trig, calculus). Remember the rules for significant digits. (20%)
7. Simultaneously, perform unit analysis. (10%)
8. Box your final answer. **Include units.**
9. **Check** that your answer makes sense.

From time to time, with no previous warning, other than these Standing Orders, you will be called on to present, both to the class and to me, your version(s) of how to work a particular problem that has been assigned. In this context, you may use your homework notebook in your presentation.

It is necessary that you learn to solve problems independently. Copied solutions from web sites are of little value and are often dishonorably submitted as one’s own work. While solving problems in groups has definite advantages, remember that you will need to solve problems independently during exams and quizzes. An understanding of Physics is required to solve a problem with nothing other than a blank sheet of paper, your calculator, and your own brain. If you continuously rely on others to think for you, you will not succeed in this course or your Navy career.

**Students are forbidden to use or possess any instructor’s solutions manual, in any form, for any textbook for which David Halliday, Robert Resnick, or Jearl Walker is an author.**
Laboratory Work: You can find the lab procedure and REQUIRED pre-lab assignments on my website. Lab Groups are picked by the students, but I reserve the right to move people if necessary. Each week a different person will take turns being the lab group leader and the person responsible for ensuring that the lab report for the group is submitted AND RECEIVED. The group will be assigned a common grade for the lab. However, as in the NAVY, not doing your fair share of the work will not be tolerated and dealt with accordingly. Only one report from each group is required or desired. Each laboratory session has a “prelab” exercise associated with it. You each (individually) are required to complete this before lab. You will submit a lab report that is professional and complete ensuring you answer all the questions asked at the completion of the lab. Additional graphs from Logger Pro should be attached to your report.

Graphs are the pictures of laboratory work and are worth 1000 words. A properly constructed graph must have the axes labeled. Units must be labeled. A title explaining or describing the graph must be included. The title should never simply restate the axis labels. Do not play “connect the dots” with your data points. Instead, draw the best smooth curve through them. If the theory shows a linear relationship, draw a straight line and calculate the slope. Sometimes the slope is related to some physical parameter or constant we are trying to measure.

Exams and Quizzes: Expect short quizzes almost daily. Quizzes can be upgraded to a max of X*(1-X)+X by coming to my office and upgrading your mistakes by taking a similar quiz or demonstrating to me that you understand the material (the choice of method is up to instructor). Three two-hour long exams will be given during the semester (not including a take home portion). Exam problems will look like homework and quiz problems. Show all the work necessary to justify your answer (including unit analysis) or you will not receive full credit. The Midterm and the final exam will be multiple choices and you should strive to not use your equation sheet. Equation sheets are good to help ensure you remember the equation correctly…i.e. is slope Delta Y over Delta X or vice versa….but if you use it as a crutch, then you will not truly understand when to use each equation and you will waste time hunting for an equation on the sheet and probably choose the wrong one.

Professionalism: Nearly all of you are used to academic success. Some of you may have earned the very first C or D of your life here at the Naval Academy, but you all earned excellent grades in high school. You will find that no matter how well (or poorly) you do at the Naval Academy, you will encounter failure much more often as a Junior Officer than you did here. All junior officers make mistakes; senior officers know this. As a result, you will often be judged by your resilience in the face of failure and your ability to avoid the same mistake twice. I will judge you by the same standard in this class.

Absences:
• Excused Absences
  1. Lab: For planned absences or movement orders, make arrangements to perform the lab with another section. Keep me informed of your plans.
  2. Test Days: Inform me ahead of time, and we will arrange a mutually convenient time for you to take the test.
• Unexcused Absences: If you have an unexcused absence on a lab or test day, you will not be permitted to make up the work, and you will receive a zero for the test or the lab.

Getting Help: Extra instruction is best obtained by appointment, but I will try to accommodate drop in’s as best I can. I expect you to have looked at the homework/lab work/quiz/exam and have some specific questions. Email can be very useful if you are working on homework or studying after normal working hours until 22:00. Put the course number (SP211) in the subject line to help me notice it and answer your question as promptly as possible. Phone calls are considered LAST resort for contacting me, but are acceptable up to 21:00 at night.

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T. J. Shivok
LCDR, USN
Learning Outcomes:

- **Learning Outcome 1 (direct single concept)** - Recognize basic physical quantities in language, connect them with their mathematical definition, and demonstrate a direct algebraically-driven calculation from the definition.

- **Learning Outcome 2 (reframe intuitions)** - Conceptualize fundamental key quantities and refine / modify your intuitions about your physical world with the help of dynamic visualizations. (This objective is not driven by calculations.)

- **Learning Outcome 3 (flexible single concept)** - In problems driven by a single key concept or idea, construct basic connections between quantities to breakdown / illustrate the main idea.

- **Learning Outcome 4 (multi-faceted)** - Reliably employ advanced mathematics as a means to explore and produce calculations in the context of a rich, multi-faceted problem. (These problems usually require vector fluency.)

- **Learning Outcome 5 (tracking and reliability)** –Develop and implement techniques for tracking work and keeping calculations reliable. (Examples include organizational structure in documentation, sketches, and dimensional analysis.)

- **Learning Outcome 6 (use of calculus)** - Apply skills from previous core courses with particular emphasis on problems involving differential and integral calculus.