PHYSICS 121

COURSE OUTLINE

Section 2: Tuesday-Thursday 1:00-2:20 p.m.
Professor: Robert Beck Clark

THIS OUTLINE contains information you need as you begin Physics 121. Please read it all -- not relying on verbal information or memory from previous semesters as there are changes.

PROFESSOR: Section 2 (TTh 9:10-10:30 a.m.): Robert Beck Clark, Office N345 ESC, Office Phone 422-2805, Email rbc@aip.org

OFFICE HOURS: WTh 11:00 - 11:50 a.m. Eyring Science Center Room E345

TEXT: Serway and Jewett: Physics for Scientists and Engineers, 7th edition, Volume 1. The text is not the complete course. We will deal with many ideas which are either not in the text or treated with different emphasis in the text. There are some copies of the text in the Tutorial Lab.

PHYSICS 121 CLASS SUPPLEMENT: The "Physics 121 Class Supplement" is available at The BYU bookstore. It contains chapter outlines, study notes, homework problems, lab instructions, the math reference sheet, the exam and homework covers and other items that you will need during the semester. You will need both the text and the supplement.

OPTIONAL BOOKS: Kleppner and Ramsey, Quick Calculus is an excellent math review, particularly for those who have been away from serious math for awhile. It is available in the bookstore.

The bookstore typically stocks other optional materials offered by the publisher. They may be useful to you, but we do not require that you purchase them.

PHYSICS 121 CID NUMBERS: Your work in the course is recorded using a personal “Class ID (CID) number” which you have probably received by e-mail. "Getting Started" tells you how to obtain a CID number if you have not received it, have deleted it or if you do not remember it.

SPECIAL SITUATIONS: If you are repeating the course for any reason, or if you are on academic probation, or if your situation is unusual in any way, please see your professor during the first week of the semester.

COURSE OBJECTIVES: We shall study the ideas and structure of Newtonian mechanics. These provide the simplest entrance to modern science and technology. They are also the best example of rational thought in western civilization. The organized thought processes are as important to you as the details of mechanics. Most students in Physics 121 are beginning serious study in one of the technical disciplines in science or engineering. The career choices in these fields are quite diverse; this course will probably help you to learn more about yourself so that you can make a wise decision for future study.

TIME: Physics 121 is a time-intensive class. There will not be a time during the semester when you do not have something to do for Physics 121. Plan on at least 20 hours per week. Some students will need much more and a few will need less. Plan for more if you have not had previous calculus or physics courses, if your math skills are rusty or weak, or if your physical intuition is not well-developed. Your best indicator may be how well you have done on the 'story problems' in earlier math and science courses. We can help you develop your skills, but plan on more time. You should probably take the course another semester if you do not have this much time now.

You may find that you have work more to do than many of your friends in other disciplines.

MATH PREPARATION: We presume that you can do algebra and trigonometry, at the level of Math 110 and 111, without undue effort and without significant errors. Almost all the items on the first page of the green Physics 121 Math reference sheet in the supplement or in Appendix B (page A.4) in the text should be familiar and usable. The appendix is in the form of a math review; it would be good for you to spend some time with it as we begin so that you know where to get some help if you need it later. You should have taken, or now be taking, a beginning calculus course (Math 112 or 119 or equivalent). We presume that you have taken an earlier calculus course. You can do well if you are taking calculus concurrently if your algebra skills are quite good; otherwise you should postpone Physics 121 until you have completed introductory calculus. If you find that you must choose between physics and math this semester, it is always wise to do math first.

PHYSICS PREPARATION: If you have not taken a high-school or college physics class, you are in a remedial mode and will have to work harder and longer than some other students. Many students without a previous physics course succeed every semester.

CALCULATOR: You will need a simple scientific hand calculator. One can usually be purchased for less than $20. If you already have a graphing calculator, you are welcome to use it for both your homework and examinations, but it will not be necessary. If you choose to use stored math programs on your graphing calculator in your work, you will need to explain what you have done when you use the stored program(s) on your homework and exams.

LECTURES: Lectures will not be a repetition of the text. We will presume that you have already studied the sections of the text indicated on the class schedule. Many important details will not be discussed in class; rather we will use the lecture time to organize, emphasize, and illustrate the most important ideas for you. We will also outline some problem-solving strategies that we have found to be helpful. Most classes will include short quizzes from the scheduled preparation or class discussion. The quiz results will be used in assigning final semester grades.

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It is sometimes popular for university students to presume that class attendance is not important. You will, of course, make this decision for yourself. We can only tell you that there will be information that you will need in almost every class and it will not be repeated elsewhere.

HOMEWORK: Physics is 'learned' only by doing physics. Watching someone else does not have lasting effect. The important ideas and techniques of physics are the subject of the homework assignments. An understanding of the homework is necessary for success in Physics 121.

Your homework assignments are due inside a white 'Homework Cover' by 4:45 p.m. on the date listed in the "Physics 121 Schedule". There are some Slots just outside the north door of 445 MARB on the lower left hand corner of the wall, where you should submit your completed homework assignments. Please place your completed homework in the "121 Homework "Slot corresponding to first digit of your CID. Your graded homework will be returned one week to ten days later, in one of the Boxes on the same wall, but located above the slots. The graded assignments will be placed in the Box corresponding to the first two digits of your CID.

The homework problems are part of the “Study Notes” in the “Physics 121 Class Supplement” – they are NOT from the Text.

Late homework assignments will receive no credit unless excused in advance by your professor. Complete readable homework solutions are required; the ‘answer’ is just one of the details. We must be able to follow your written problem solutions and we will assign a score of 0-4 for each homework problem, that reflects the quality of your work and your explanation of your work. We score homework and exams on the basis of accuracy, clarity and completeness with half of the credit being given for the written explanation of your reasoning. Your explanations should be in the form of complete English sentences.

WALKIN LABS: Weekly experiments are to be done in the Walkin Lab, S415 ESC. The equipment will be available anytime that the building is open. Go to the lab, do the experiment, and calculate your results. Then hand in your report in the Physics 121 Slot just inside the door of the lab room itself, corresponding to the first digit of your CID number. Come to the lab on or before the day designated for you on the schedule. Your report is due the evening of “your designated day”, determined by the first digit of your CID number. M:0-1, T:2-3, W:4-5, Th:6-7 or designated F:8-9.

The building is closed on University holidays and the lab will not be available on those days. You may do the lab any day it is available if 'your designated day' falls on a holiday. Each lab report is scored 0-3 on the basis of your experimental results and on the quality of your analysis, with about half of the credit for each.

You can get help with nonfunctioning equipment, during normal university office hours, by following the instructions in the lab, or by contacting Bro. Freeman Anderson at 422-5393 (or in room N490 ESC).

Late lab reports will receive no credit without the advance approval of your professor.

POSTED SOLUTIONS: Solutions to homework problems and exams will be posted in display cases in the hallway near N361 ESC. These are for your review or study and are not to be copied; photo-copying our posted solutions without permission is a violation of US copyright law. (You may make personal notes.)

TUTORIAL LAB: Teaching assistants will be available in the Tutorial Laboratory, N361 ESC, to help you with physics-related questions. The room is open whenever the building is open, but TA's are only present during certain hours which we will post. The Tutorial Lab is not a study hall. It is a place you can come to get help on problems you have already worked on. It is not a place to do your homework, although there is some table space available to finish or write up problems to hand in. The Tutorial lab is open, with fewer TA's, during the reading days and will be closed during final exams and holidays.

COLLABORATION: You may study with other students and we encourage you to form study groups. However, you should not use or submit completed solutions simply provided by other students or some other source. Personal integrity would dictate that such work would not be submitted; your own intelligence will tell you that such practices will leave you with inadequate preparation for classes and professional assignments in the future. Submitted work needs to be done with your own understanding and in your own words. However, you may collaborate to obtain understanding.

Exams, of course, are not collaborative projects; you must do them without outside help. In general, we encourage students to engage in group discussion and collaborative learning. Students are encouraged to work together on homework, prepare for exams together, and learn from each other. Today's science and engineering efforts require teamwork and collaboration to achieve success, and employers want to see this in their employees. So start now, have fun, learn, and meet fellow students on a more personal basis.

MIDTERM and FINAL EXAMS: There are three 'midterm' exams administered in the Testing Center as scheduled on the “Physics 121 Schedule”. You can expect questions and problems covering a wide range of difficulty, some simpler than the homework problems, some similar to the most complex, and some that will ask you to extend the ideas to new situations. The exam questions will often require knowledge and strategies from several parts of the course.
The exams are closed book and notes except for your green ‘Math Reference Sheet’ and your yellow ‘Exam Cover’ (from the Class Supplement). You may write your own collections of information (whatever notes you wish!) on your ‘Exam Cover’. Your notes on the exam cover provide you with the opportunity to summarize, for yourself, whatever you think is important. Photocopied information is not appropriate.

You will need your ‘Exam Cover’ and pencil or pen. You may also need your green ‘Math reference sheet’, a calculator, and blank scratch paper. There is no time limit except for the Testing Center schedule. Our objective is to allow you to do your best without arbitrary time constraints.

The Final Exam will be given at the Testing Center on the days indicated in the “Physics 121 Schedule”. No exams will be given outside of those dates and times. It will be an 'answers only' multiple-choice format exam so that you can get early results. Instructions are on the "Physics 121 Final Exam Instructions" page in the “Physics 121 Class Supplement”.

EMERGENCIES and MAKEUP: Please contact your professor as soon as you know of any emergency circumstance that may keep you from meeting the class schedule.

APPEALS: Any appeals for homework, lab or examinations must be submitted in writing in the Physics 121 appeals slot next to homework submission slot. In your written appeal, describe the nature of the grievance: clerical errors, scoring disputes, etc. Staple your written appeal to the front of the graded examination. An appeal must be submitted within 7 days of the date that the graded homework, lab or examination was returned to the class. Please write your Section Number at the top of your written appeal.

INCOMPLETES: If you find that you cannot complete the course before the end of the semester, you may want to petition for an ‘I’ (incomplete). Please inform your professor as soon as you think you might need this option. The university regulations are quite stringent, and there are sometimes other ways to work around a problem.

WWW SCORES: You may check your current scores on the web at http://www.physics.byu.edu/Courses/. Select “Check your Grade”. You should check your recorded grades regularly to be sure that your scores are correctly recorded. The posted scores are updated every night so that corrections usually do not appear until the following day. The computer-generated grade is only an interim estimate.

BYU STANDARDS: We fully support the Church program of which BYU is a part. We intend to support and uphold the honor code, and other University rules and traditions. We consider these as a set of agreed standards of conduct and also as a statement of the kind of community in which we would like to live.

SEXUAL HARASSMENT: If you encounter sexual harassment or gender-based discrimination, please talk to your professor, contact the Equal Employment Office (422-5895), or contact the Honor Code Office (422-2847). BYU's policy against such harassment extends to all members of the university community.

STUDENTS WITH DISABILITIES: Please contact the University Accessibility Center (422-2767) if you have any disability that may adversely affect your success in this course. BYU provides reasonable accommodation to qualified persons with disabilities with services to be coordinated through that office.

A NOTE ON HONESTY. We all know that there are several ways to receive a high grade in any course without doing assigned work and without knowing very much. Those who use these strategies will be punished by inexorable, and immutable laws of human intellectual development. Unless repented of, such habits invariably lead their victims to become professional and intellectual parasites. If you are caught in this trap, we invite you to repent now before the consequences become more obvious to everyone. We can help.

Please do not copy posted exams and solutions to homework problems and exams. Since these can only be obtained dishonestly, we presume that you would not use such material, if you were to encounter it. Copying is not only a violation of the Honor Code, but using such items is a very inefficient way to study the course material and to develop intellectually.

GRADES: Your semester grade is based mostly on your four examination grades. They are all equally weighted. The midterm and final exams will each have a score from 0 to 100. See the accompanying sheet for the grade scale used in assigning letter grades. This is an absolute scale. There is no “bell-curve” for grading in this course, so again we urge you to work together and help each other understand the concepts as much as you can. Thus you will learn charity as well as physics!

Semester grades are determined by the following procedure. (1) All four of your examination grades are added. (2) The excess total lab points over 40 are then added to this total and an average is obtained by dividing this total by 4. Note that the maximum number of lab points possible is 13 labs x 4 points = 52 points (3) We will then include your homework score, with a weight equal to 2/3 of a single exam, if it improves your average. (4) A letter grade is then assigned based on the grade scale. (5) The semester letter grade is then reduced one grade step (B+ to B, for example) if your total lab score is below 40 points. It is reduced two steps if it is below 26 points, and a full letter grade if it is below 13. (6) Finally we may adjust your final grade by as much as one grade step based on the results of your classroom quizzes.
Physics 121
Grade Scale

90-100  A
80-89.9  A-
73-79.9  B+
66-72.9  B
60-65.9  B-
53-59.9  C+
46-52.9  C
40-45.9  C-
33-39.9  D+
26-32.9  D
20-25.9  D-
0-19.9  E