

PIKEVILLE COLLEGE
SPRING 2008
COURSE REQUIREMENT SHEET

Course Prefix & Number: PHY 300

Course Title: Engineering Physics

Course Credit Hours: 2 Credits

Official Course Description: Selected topics in classical mechanics, thermodynamics, wave motion, sound, electricity, magnetism, light and optics, with the application of calculus in physics.

Course Prerequisites: Grade "C" or better in PHY 224.

Professor's Name: Dr. Robert Arts

Professor's Phone Number: 218-5476

- Leave a message if you call; don't assume just because you tried to call that I know that you tried to call.

Professor's E-mail: rarts@pc.edu

- I do not generally check email past 9:00 p.m. So, please do not assume if you send a late message that I will get it until the next day. Plan ahead if you need to ask a question.
- Also, please at least check for a reply if you send me an email. Far too often I get the question "Did you get my email" and my response is "Yes, I sent you a reply" to which I get the response "Oh, I did not check." So, don't send me a message unless you actually care about the response!

Professor's Office Location: Room 307
Armington Science Building

Professor's Office Hours: Friday = 9:00 a.m. - 9:50 a.m.
Monday, Wednesday and Friday = 11:00 a.m. - 11:50 a.m.

- Please feel free to contact me for alternate meeting times if these times are not convenient for you and you wish to see me.

Required Text & Supplies: *Calculus 2000* by E.R. Huggins of Dartmouth College

- The text takes the topics that have already been introduced in general physics I & II and shows how these topics can be handled in progressively more sophisticated mathematical ways. The 300+ page text, in its entirety, is available as a free download from: <http://www.physics2000.com/PDF/Calculus2000.pdf>

Recommended References:

- Das, B. (2006). *Mathematics for physics: With calculus*. Upper Saddle River, NJ: Prentice Hall. ISBN: 0-13-191336-0
- Browne, M. (1999). *Physics for engineering and science*. Schaum's Outlines. New York: McGraw Hill. ISBN: 0-07-008498-X

PIKEVILLE COLLEGE
SPRING 2008
COURSE REQUIREMENT SHEET

Course Outcomes:

Critical Thinking

Most students take this course to fulfill the related studies requirements for entrance into an associated engineering degree program; so the level of instruction is quite rigorous. You will be expected to comprehend fundamental concepts and apply physical reasoning to a variety of situations. Many students find physics difficult because it goes beyond memorization by requiring higher level thinking skills (levels 4 through 6 below). Learning physics is also like learning a foreign language since new words and symbols must be understood and applied correctly within the context of various physical situations.

Bloom's Taxonomy of the Cognitive Domain:

1. Knowledge - memorization of facts, words, and symbols
2. Comprehension - understanding the meaning of knowledge
3. Application - applying concepts to various situations
4. Analysis - breaking apart complex ideas
5. Synthesis - putting individual ideas together to form a complete explanation
6. Evaluation - judging the merits of individual ideas and making decisions

Not only are these skills needed for physics, but employers consistently rank critical thinking and problem-solving ability near the top of their list of desired traits in valued employees.

Upon completion of the course the student will have learned to apply more sophisticated mathematical methods in order to:

- Analyze the motion of an object in one, two, and three dimensions. (Analysis)
- Apply Newton's three laws to predict the outcome dynamic situations. (Application)
- Analyze the conditions for equilibrium of a rigid body that is turning (torque and angular momentum). (Analysis)
- Analyze the quantitative relationships among force, area, and pressure in fluids to specific situations related to buoyancy, hydraulics (Pascal's law), and Bernoulli effects. (Analysis)
- Apply the Laws of Thermodynamics to given situations. (Application)
- Evaluate the force between two charged particles as a function of the distance between the particles. (Evaluate)
- Evaluate the relationship between electric current, voltage, resistance, capacitance, and inductance. (Evaluation)
- Analyze the formation of magnetic fields from moving electric charges. (Analysis)
- Analyze the characteristics of electric fields and the electric potential surrounding point charges. (Analysis)
- Summarize the effects of forces on magnetic fields produced by moving charged particles and current carrying wires. (Evaluation)
- Apply the concepts of magnetic flux, Faraday's Law, Lenz's Law to electromagnetic induction. (Application)

PIKEVILLE COLLEGE
 SPRING 2008
 COURSE REQUIREMENT SHEET

Course Contribution to the General Education Outcomes:

General Education Outcomes	Course Contribution
1) The Pikeville College graduate will demonstrate effective oral and written communication skills.	Successful completion of PHY 300 will contribute to a student's being able to demonstrate this outcome by adequately writing answers to open response essay questions on each of the required examinations.
2) The Pikeville College graduate will demonstrate effective quantitative skills.	Successful completion of PHY 300 will contribute to a student's being able to demonstrate this outcome by applying specific mathematical equations in order to answer questions within each of the required assignments.
3) The Pikeville College graduate will demonstrate independent and critical thinking.	Successful completion of PHY 300 will contribute to a student's being able to demonstrate this outcome by performing data analysis, concept application, and information synthesis in their analysis of physics concepts.
4) The Pikeville College graduate will demonstrate cultural awareness.	N/A
5) The Pikeville College graduate will demonstrate historical awareness.	N/A
6) The Pikeville College graduate will demonstrate basic scientific knowledge.	Successful completion of PHY 300 will contribute to a student's being able to demonstrate this outcome by applying the student's knowledge of physics to calculus.
7) The Pikeville College graduate will demonstrate awareness of social science concepts.	N/A
8) The Pikeville College graduate will demonstrate ethical awareness.	N/A
9) The Pikeville College graduate will demonstrate the ability to integrate knowledge across disciplines.	Successful completion of PHY 300 will contribute to a student's being able to demonstrate this outcome by drawing together elements from chemistry, physics, engineering and mathematics.
10) The Pikeville College graduate will demonstrate effective use of technology.	N/A

PIKEVILLE COLLEGE
 SPRING 2008
 COURSE REQUIREMENT SHEET

Course Outline:

DAY	DATE	OUTLINE
W	1/9	Introduction
M	1/14	Lecture = Chapter 1 (pp. 1-5 to 1-14)
W	1/16	Lecture = Chapter 1 (pp. 1-18 to 1-22)
M	1/21	No Class - Martin Luther King Holiday
W	1/23	No Class – Dr. Arts will be out of town
M	1/28	Lecture = Chapter 2 (pp. 2-9 to 2-13) Quiz #1 = Chapter 1 (Due in 24 hours) HW #1 Due = Chapter 1 (Exercise 1 & 4)
W	1/30	Lecture = Chapter 2 (pp. 2-14 to 2-21)
M	2/4	Lecture = Chapter 3 (pp. 3-1 to 3-12) Quiz #2 = Chapter 2 (Due in 24 hours) HW #2 Due = Chapter 2 (Exercise 5, 6, 7, & 8)
W	2/6	Lecture = Chapter 3 (pp. 3-18 to 3-21, 3-29, & 3-30)
M	2/11	Lecture = Finish Chapter 3 and/or Review Quiz #3 = Chapter 3 (Due in 24 hours) HW #3 Due = Chapter 3 (Exercise 1 [p. 3-5], 1 [p. 3-12], 4a, & 4b)
W	2/13	Lecture = Chapter 4 (pp. 4-1 to 4-6 [Cartesian]) Exam #1 = Chapters 1, 2, and 3 – Handed Out
M	2/18	Lecture = Chapter 4 (pp. 4-9 to 4-11) Exam #1 due at class time
W	2/20	Lecture = Chapter 5 (pp. 5-1 to 5-7) Quiz #4 = Chapter 4 (Due in 24 hours) HW #4 Due = Chapter 4 (Exercise 1)
M	2/25	Lecture = Chapter 5 (pp. 5-8 to 5-10)
W	2/27	Lecture = Chapter 5 (pp. 5-11 to 5-14)
M	3/3	Lecture = Chapter 7 (7-1 to 7-6) Quiz #5 = Chapter 5 (Due in 24 hours) HW #5 Due = Chapter 5 (Exercise 2 & 4a-d)
W	3/5	Lecture = Chapter 7 (7-6 to 7-10)
M	3/10	No Class - Spring Break
W	3/12	No Class - Spring Break

PIKEVILLE COLLEGE
 SPRING 2008
 COURSE REQUIREMENT SHEET

Course Outline (Continued):

M	3/17	Lecture = Finish Chapter 7 and/or Review Quiz #6 = Chapter 7 (Due in 24 hours) HW #6 Due = Chapter 7 (Exercise 1, 2, & 3)
W	3/19	Lecture = Chapter 8 (pp. 8-1 to 8-5) Exam #2 = Chapters 4, 5, & 7 – Handed Out
M	3/24	Lecture = Chapter 8 (pp. 8-6 to 8-10) Exam #2 due at class time
W	3/26	Lecture = Chapter 8 (pp. 8-11 to 8-14)
M	3/31	Lecture = Chapter 9 (pp. 9-1 to 9-3) Quiz #7 = Chapter 8 (Due in 24 hours) HW #7 Due = Chapter 8 (Exercise 1 & 2)
W	4/2	Lecture = Chapter 9 (pp. 9-4 to 9-7)
M	4/7	Lecture = Chapter 10 (All) Quiz #8 = Chapter 9 (Due in 24 hours) HW #8 Due = Chapter 9 (Exercise 1)
W	4/9	Lecture = Finish Chapter 10 and/or Review
M	4/14	Lecture = Chapter 11 (pp. 11-1 to 11-3) Exam #3 = Chapters 8, 9, & 10 – Handed Out
W	4/16	Lecture = Chapter 11 (pp. 11-4 to 11-7)
F	4/18	Exam #3 due at 10:00 a.m.
M	4/21	Lecture = Chapter 12 (pp. 12-1 to 12-8) Quiz #9 = Chapter 11 (Due in 24 hours) HW #9 Due = Chapter 11 (Exercise 1 & 2)
W	4/23	Lecture = chapter 12 (pp. 12-9 to 12-13)
M	4/28	Lecture = Review Quiz #10 = Chapter 12 (Due in 24 hours) HW #10 Due = Chapter 12 (Exercise 1 & 2) Exam #4 = Chapters 11 & 12 – Handed Out
F	5/2	Final Exam (Exam #4: Chapters 11 & 12) due by 3:30 p.m.

Course Structure:

We will be meeting MWF week to discuss aspects of engineering, calculus-based physics that range from the basics of motion and electric circuits to electricity and magnetism.

PIKEVILLE COLLEGE
SPRING 2008
COURSE REQUIREMENT SHEET

Assignments

Homework:

Homework will be assigned from the Calculus 2000 text. The specific problems associated with each chapter are shown in the previous course outline.

All work must be shown when doing problems and clear explanations given for all questions; including any multiple choice questions. Reduced credit will result if these procedures are not followed. Working additional problems can help you understand the problem(s) assigned.

* Homework assignments are worth up to 100% each and are due on the day indicated on the course calendar outline. There are ten homework assignments for the semester which you must complete.

Quizzes:

Quizzes are worth up to 100% each and are handed out at the end of class on the class day following completion of the material from a selected chapter. These quizzes will generally be several multiple choice and/or open response questions related to the chapter's material. To receive full credit for a multiple choice problem, both the correct answer ($\frac{1}{2}$ credit) and a reasonable explanation ($\frac{1}{2}$ credit) must be indicated for each problem; open response problems are graded more on the process of getting to the answer rather than the obtaining the correct answer. Quizzes are designed to be take-home assignments and are due within 24 hours of the time in which they are given out; i.e. by 2:30 p.m. the following day.

Exams:

The three midterms (Exam #1 - Exam #3) are worth up to 100% each. They will generally consist of multiple choice concept questions and/or open response application problems from each chapter covered by the exam. To receive full credit for a multiple choice problem, both the correct answer ($\frac{1}{2}$ credit) and a reasonable explanation ($\frac{1}{2}$ credit) must be indicated for each problem; open response problems are graded more on the process of getting to the answer rather than the obtaining the correct answer. The final exam (Exam #4) will be treated as a fourth midterm, with the same structure. As with the quizzes, each exam is a take-home assignment. They are generally due 5-7 days after the time in which they are given out. Please see the course calendar outline for the specific dates.

Tutoring Center

- Staffed by members of the faculty, staff, and student body, the tutoring center provides a variety of services to Pikeville College students through peer tutoring, computer tutorials in math and English, and a videotaped lecture series in math.
- The Tutoring Center is located in Allara Library, Room 001; it is open Monday through Friday from 9:00 AM to 4:00 PM. All Tutoring Center services are free. You can contact the Center by phoning (606) 218-5602.

PIKEVILLE COLLEGE
SPRING 2008
COURSE REQUIREMENT SHEET

Use of Technology:

- (Dr. Arts' Personal) <http://campus.pc.edu/~rarts/>
- (Calculus 2000) <http://www.physics2000.com/PDF/Calculus2000.pdf>

Course Requirements & Evaluation:

The final course grade will be based on the breakdown below:

Homework:	20% (2.0% for each of 10 HW Assignments)
Quizzes:	20% (2.0% for each of 10 Quizzes)
Exams #1-#3:	45% (15% for each of the 3 Exams)
Exam #4 (Final):	<u>15%</u>
TOTAL:	100%

** Grade Determination Scale: The grade scale for the class is based on the 10% scale illustrated below:

<u>Grade Range</u>	<u>Letter Grade</u>
100.0% - 90.0%	A
89.9% - 80.0%	B
79.9% - 70.0%	C
69.9% - 60.0%	D
59.9% - 0.0%	F

- I reserve the right to move you into a higher grade bracket if you have a border-line grade and if it is deemed appropriate.

Late Assignment Policy: As all the material is important to your understanding of the course, absence from the lecture requires you to make up or submit any missed assignments. I will only give permission for a make-up provided a valid excuse is presented within **24 hours** of the missed assignment. In addition, if you are aware of an upcoming lecture meeting that will be missed due to prior obligations, please contact me ahead of time to make arrangements to complete or turn in any assignments that are due that day. I acknowledge that many of you have additional responsibilities outside of this class (work, family obligations, school functions, etc.). However, this is no excuse for missing class and/or missing class work. Do not assume that I will ask you to make up or submit any missed work; because I will not. It is your responsibility to contact me and make these arrangements! Finally, if you are aware that you will not be in class on the day when an assignment is due, you are still responsible for submitting that assignment on time! This means that you have three options:

- Submit the work early
- Send your work with a friend to drop off for you
- Understand that there will be a deduction (generally 10% per day late) if you submit the assignment when you return (after the due date).

PIKEVILLE COLLEGE
SPRING 2008
COURSE REQUIREMENT SHEET

Attendance Policy: All the material is important to your understanding of the concepts presented. In addition, the pace of the class is quite rapid. Therefore, you are strongly encouraged to attend all classes. Failure to attend class will only serve to hurt your chances in the course. In addition, attendance is required for all laboratories. By not attending a particular laboratory you only serve to hurt your chances for a good grade in the course. Don't expect to make up a missed laboratory unless you submit a valid excuse within the 24 hour require notification window. If you cannot attend a scheduled class meeting, please contact me or the division secretary (Lacey Ross 218-5460) prior to your absence.

Withdrawal Policy:

- From the first day of class until the *Last day to receive a grade of "W"* (see the Academic Calendar for this specific date), you may officially withdraw from a class and receive a grade of W. However, in the unlikely event that you wish to withdraw from the course I'd appreciate you contacting me first. I will do what I can in order to help keep you enrolled in the course; if there is anything that can be done.
- After this cutoff date through the end of class work (again, see the Academic Calendar for the specific date), I will allow you to withdraw with a grade of "WP" only under extraordinary circumstance such as illness, accident, etc. If you have stopped showing up, have not contacted me, and wish to withdrawal after the "W" date, then I will not be as receptive to helping you and you may simply have to live with the consequences of your actions; i.e. receiving an "F" or a "WF." You are an adult and I will treat you as such. From the same standpoint, if you treat me with the respect I deserve than I will be willing to do the same for you. Please keep an open line of communication at all times regarding your involvement in this course.

Academic Conduct: "Instances of plagiarism or academic dishonesty may result in the student receiving a failing grade for the activity, being requested to withdraw from the course (W) (WP) (WF), or receiving a failing grade for the course according to the perceived intent and extent of the instance(s) of academic dishonesty."

- This means don't copy your friend's homework, quizzes, or exams! Do your own work!

ADA Information:

- Pikeville College is committed to providing students with disabilities the same educational programs and services offered other students, in accordance with Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act (ADA) of 1990. Under Section 504, a student has a disability if that individual has a physical or mental impairment that substantially limits major life activities such as walking, seeing, hearing, speaking, working, or learning. Section 504 further requires that institutions make appropriate and reasonable adjustments for students with disabilities to ensure accessibility to academic and nonacademic activities. Under ADA, all institutions of higher education must comply with government policies, procedures, and employment practices that impact the treatment of students. If you have a disability that warrants special accommodation within this course, please contact the Disabilities Resources Office located in the Student Services Counselor's Office.

Disclaimer:

The schedules and policies associated with this course may be subject to revision or change as a consequence of changing circumstances or events. Reasonable notification will be provided to students prior to any major changes in course policies or procedure.

Course Requirement Sheet Acknowledgment Form

I, _____, have received a copy of the Course
(Printed Name)

Requirement Sheet for **Physics 300 – Engineering Physics** and understand all the policies and procedures outlined therein.

(Signature)

(Date)

Please fill out the information requested below. Please Print Clearly!!

Major: _____

Contact Phone Number: _____

E-mail Address (the one you use): _____

Medical information that the instructor should be aware of: _____

Comments: _____

- This Course Requirement Sheet Acknowledgment Form is to be filled out and returned to me by the end of the first class period!