

PHYS 110

Technical Physics

Course Syllabus:

Title: **Technical Physics & Lab**

Catalog Number: **PHYS-110**

Credits :4

(Lecture/Lab)

Instructor: **Kevin Kimball**

Total Contact Hours: **75**

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Contact Info: **207-741-5579 office**

Course Description

This course represents a non-calculus, rigorously algebraic approach to the analysis of the concepts and relationships in physics. Topics of study will Scientific Method, Mechanics; Kinematics in one and two dimensions; Dynamics; Newton's Laws of Motion; Rotation and Torque; Uniform Circular motion; Analysis of Concurrent Forces; the Laws of Machines; the interrelationship of Energy, Force, Work, and Power; Waves; Sound and Light; Electricity and magnetism; Universal Gravitation; Key Historical Figures in Physics and Their Contributions and Accomplishments; Astronomy and Cosmology; Special and General relativity; Structure of the Atom; Quantum Physics, and String/"M" Theory.

Emphasis will be placed on understanding natural phenomena and solving mathematical problems in physics using both Metric (SI) and English(US) Systems of units.

Laboratory experiments and exercises will allow the student to develop a feel for realistic measurements, practical critical thinking skills, and meaningful calculations. Prerequisites: Successful completion of MAT 050 (Intro to Algebra) or equivalent.

Scope of Course

The course consists of three hours of lecture and one two-hour lab session per week for the semester. The usual holidays and vacations of the College will be observed. Classes will run at a pace that prohibits absence except in the case of legitimate emergency. If absence is unavoidable, it is the responsibility of the student to check with other students for notes and with the instructor for make-up work. THERE WILL BE NO MAKE-UP LABS.

Text (NEW, not used!)

Phys 110 Technical Physics Workbook (*Kimball*)

Equipment (required)

- Scientific Calculator (must have trig functions, and NOT your cell phone!)
- Loose-leaf, three-ring notebook

NOTE:

The use of lap-top computers, "Blackberries," cell phones and/or any other electronic data-transmitting/retrieval equipment in class is **prohibited**.

COURSE OBJECTIVES:

Enabling Objectives:

- The student will become conversant in the basic terminology of physics.
- The student will become familiar with SI units of measurement and correctly apply them to physics problems.
- The student will be able to accurately express powers of ten as metric prefixes and vice-versa.
- The student will become proficient in the use and application of Scientific Notation.
- The student will be able to perform unit conversions for single and multi-dimensional values.
- The student will become proficient in using "field shorthand" techniques that expedite execution of algebraic problems and solutions.

Terminal Objectives:

- The student will be able to differentiate between scalar and vector measurements.
- The student will be able to compare and contrast commonly confused and misunderstood concepts such as weight vs. mass, velocity vs. acceleration, theory vs. hypothesis, etc.
- The student will be able to use basic algebra and trigonometry skills to solve real, tangible problems in physics by interpreting given data and applying relevant data to correct physics formulas.
- The student will be able to synthesize known principles in physics and mathematics with new data to derive new insights.
- The student will be able to execute proper procedure (including relevant safety protocol) in Laboratory settings.
- The student will be able to accurately report events and findings in quantitative terms in written lab reports.
- The student will become conversant in the principles of the Scientific Method and how it relates to laboratory technique, research, peer review, and the progress of science as a whole; the student will be better able to discriminate between popular “pseudo-science” and actual science.
- The student will be able to demonstrate comprehensive grasp of physics concepts in written essay form.
- The student will be able to compare and contrast (in broad yet accurate terms) Classical Physics with Modern Physics.

COURSE REQUIREMENTS:

- **Attendance** is critical, and will have a direct bearing on your grade:

# ABSENCES	HIGHEST POSSIBLE FINAL GRADE	NOTE:
0 - 3	A	TARDINESS/EARLY DEPARTURE 20 MINUTES OR MORE COUNTS AS ½ OR 0.5 ABSENCE
3.5 - 4	B	
4.5 - 5	C	
5.5 - 6	D	
MORE THAN 6	F	

- One excused absence from Lab will be allowed; subsequent missed labs will receive a grade of zero.
- Tests/quizzes: Missed tests and quizzes must be completed within two school days of original date
- Lab reports: Lab reports are to be typed, not handwritten (the only exception allowed will be for the inclusion of calculations and hand-drawn sketches). Lab partners may submit a single lab report for the group. Lab reports are due one week from the lab.

Assigned Reading:

Students are responsible for timely completion of reading assignments. Students are expected to check themselves for comprehension with text exercises; students are expected to report problems with exercises to the instructor for in-class discussion

GRADING

There will be quizzes approximately every 1-2 weeks. There will be a mid-term exam and a final exam. Quizzes and exams will feature both closed-book and open-book/notes formats.

Your final grade for this course will be based on a combination of the following assessments:

- Unit assignments/quiz's (50%)
- Lab reports (25%)
- Final exam (25%)

A: 90-100

B: 80-89

C: 70-79

D: 60-69

F: Below 60

COURSE OUTLINE/TOPICS

- Intro to Physics
 - The Scientific Method
 - Required Math Skills, Metric System
 - Basic/Derived SI units
 - Vector and Scalar Quantities
 - Laws of Motion, mass, force, velocity, acceleration, inertia
 - Historical Figures
 - Concurrent forces
 - Projectile motion
 - Energy, work and power
 - Simple machines, The law of Simple Machines
 - Wave theory, sound, light
 - Electromagnetism
 - Universal Gravitation
 - Intro to Modern Physics, astronomy, cosmology
 - Special and General Relativity, Lorentz Transformations
 - Structure of the Atom, mass defect, binding energy, quantum mechanics
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- Unification, String/"M" Theory

ADA Syllabus Statement

ADA (Americans with Disabilities Act):

Southern Maine Community College is an equal opportunity/affirmative action institution and employer. For more information, please call [207-741-5798](tel:207-741-5798). If you have a disabling condition and wish to request accommodations in order to have reasonable access to the programs and services offered by SMCC, you must register with the Disability Services Coordinator, Sandra Lynham, who can be reached at 741-5923. Further information about services for students with disabilities and the accommodation process is available upon request at this number. Course policies about online testing are modified to suit each individual's accommodations.

Course Evaluation

Students may evaluate the instructor online and anonymously by going to "Resources for Current Students" at the SMCC homepage and choosing "Evaluate Your Courses."

SMCC Pay-for-Print Policy

This policy identifies the cost per page for black and white as well as color printing in varying page sizes. Specifics of the policy are outlined below:

Per Page Costs

Each semester students receive a \$20 printing credit. The balance resets at the end of the semester and any remaining credits are removed. The cost varies depending upon page size and whether printing is done in black and white or color.

- a. There is a \$0.10 per page fee for standard 8.5" by 11" black and white documents.
- b. The reverse sides of duplex (double-sided) documents are free.
- c. There is a \$.50 per page fee for standard 8.5" by 11" color documents.
- d. There is a \$.20 per page fee for 8.5" by 14" (legal) or 11" by 17" (tabloid) black and white documents.
- e. There is a \$1.00 per page fee for 8.5" by 14" (legal) or 11" by 17" (tabloid) color documents.

Duplex charges (printing on both sides of a page) work in the following fashion: One page is \$0.10, two pages are \$0.10, three pages are \$0.20, and four pages are \$0.20, *etc.* The flipsides are free, but another sheet of paper is \$0.10. Please be aware that a document with any color at all (when printed to a color printer) will by default be printed in color. You are responsible for setting the print job to print black and white if you do not need color. For directions, please go to the IT Help tab in My SMCC.

How does it work?

The College's pay-for-print system monitors printing on all printers (including those in general access labs, library printers, the Academic Achievement Center, Noisy Lounge and technology labs). Students can check the number of pages they have printed by using the Printing Balance tool available on SMCC computers (located in the lower right corner of the screen, near the clock). Departments with work study students who need to print documents for the department should contact the HelpDesk at 741-5696 to have a special account set up.

Refunds

Print jobs are eligible for a refund in the event of mechanical or electronic error on the part of the printer, print server, or software used to submit the job. Jobs are not eligible for a refund in cases where the job was not set up correctly, was submitted multiple times, or the student is not satisfied with the result. To request a refund, please bring the offending print to the

IT Department in the basement of the Ross Technology Center. Refunds will be granted in the form of a credit to the student's account.

Why is SMCC charging for printing?

The pay-for-print system is an effort to control escalating printing costs. Charging for printing helps offset the increasing cost of supplies and encourages students to conserve resources. To find ways to reduce your printing charges, please go to the IT Help tab on My SMCC. If you have questions about the pay-for-printing policy or your printing charges, please contact the HelpDesk at 741-5696 or send an email to helpdesk@smccme.edu.

Add-Drop Policy

Students who drop a course during the one-week “add/drop” period in the fall and spring semesters and the first three days of summer sessions receive a 100% refund of the tuition and associated fees for that course. Please note any course that meets for less than the traditional semester length, i.e., 15 weeks, has a pro-rated add/drop period. There is no refund for non-attendance.

Withdrawal Policy

A student may withdraw from a course only during the semester in which s/he is registered for that course. The withdrawal period is the second through twelfth week of the fall and spring semesters and the second through ninth week of twelve-week summer courses. This period is pro-rated for shorter-length courses. To withdraw from a course, a student must complete and submit the appropriate course withdrawal form, available at the Enrollment Service Center (no phone calls, please). The designation “W” will appear on the transcript after a student has officially withdrawn. A course withdrawal is an uncompleted course and may adversely affect financial aid eligibility. Failure to attend or ceasing to attend class does not constitute withdrawal from the course. There is no refund associated with a withdrawal.

Plagiarism Statement

Adherence to ethical academic standards is obligatory. Cheating is a serious offense, whether it consists of taking credit for work done by another person or doing work for which another person will receive credit. Taking and using the ideas or writings of another person without clearly and fully crediting the source is plagiarism and violates the academic code. If it is proven that a student in any course in which s/he is enrolled has knowingly committed such a violation, appropriate action will be taken which may result in suspension from the course and a failing grade in the course. Students have the right to appeal these actions to the Dean of Students under the terms outlined in the Student Code of Conduct. For more information consult the Student Handbook.