Syllabus

SOUTHERN MAINE COMMUNITY COLLEGE
envision a future

South Portland, Maine 04106

Physical Sciences Department

Title: Technical Physics	**Catalog Number: PHYS-110**
Credit Hours: 4	**Total Contact Hours: 80**
Lecture/Lab	**Instructor: Professor Kevin Kimball**
Office Hours – Location:	**Contact Information:**
By appointment	kkimball@mainecc.edu

Course Syllabus

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.

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 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
- Unification, String/"M" Theory

Student Evaluation and Grading

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

NOTE: You must complete all labs and the Final Exam to pass the course.

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

- Unit assignments/tests, Lab Assignments (75%)
- PHYS Workbook spot checks: PHYS Workbooks will be periodically spot-checked **without warning** and graded for completeness and entered in the gradebook as an assignment/quiz.
- Final exam (25%)
- **ATTENDANCE: Three excused absences from lectures are allowed; each subsequent absence will result in 1-point reduction in final course grade**

A: 90-100
B: 80-89
C: 70-79
D: 60-69
F: Below 60

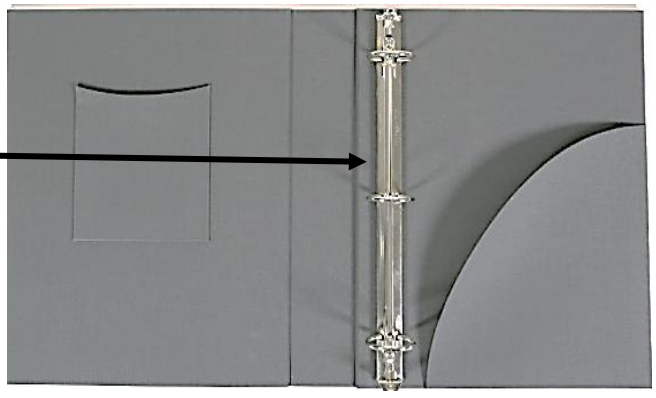
MATERIALS FOR COURSE

REQUIRED, no exceptions:

PHYS 110 Technical Physics Workbook, Kimball
(available at SMCC Bookstore only)
Three-ring loose-leaf binder (see below)
Scientific Calculator TI 30X II S
(NOT your phone!)
Achieve Essentials for College Physics
ISBN 9781319369767
Ability to process Word/PDF documents
Access to a printer

NOTE:
The use of cell phones, i-pads, laptops, earbuds, and any other electronic data-receiving/transmitting devices during in-class lectures and discussions **is expressly prohibited unless otherwise specifically authorized.**

STRONGLY recommended:
Three-ring binder with
offset ring mechanism
(to reduce page tearing);



Attendance Policy

- Three excused absences from lectures are allowed; each subsequent absence will result in reduction in final grade:

End-of-Course Evaluation

Students complete evaluations for each course attended at SMCC. Evaluations are submitted online and can be accessed through the student portal. Students can access the course evaluations beginning one week before the end of classes. The deadline for submission of evaluations occurs Monday at 5 p.m. following the last day of the class. You will receive an e-mail to your student e-mail account when course evaluations are available.

ADA Statement

Southern Maine Community College is an equal opportunity/affirmative action institution and employer. For more information, please call (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.

The Learning Commons:

The library, tutoring and writing centers, and reference/research assistance (typically located on the second
floor of South Portland's Campus Center and in the Midcoast's LL Bean Learning Commons and Health Science Center) will be fully available online during the fall 2020 semester.

Here you can find free academic support through individually scheduled and drop in, online tutoring. You can also find information literacy/research librarians, and professional academic strategy/planning mentoring online. While the physical space of the Learning Commons will not be available at this time, we can also work with you to set up zoom classrooms for small group study. Services are offered by appointment or as drop-in assistance.

To access services:

- Visit My Learning in My Maine Guide or
- Select the "tutoring needed" button if it appears inside your Brightspace course.

Whether On Site or Online, students have consistently reported that the Learning Commons is a friendly, risk-free, and helpful place to seek academic support. It has also been shown that those who make use of the Learning Commons do better in a course than those who do not. We strongly encourage you to take advantage of this valuable and enjoyable resource.

SMCC Pay-for-Print Policy

Each semester students receive a $20 printing credit. The balance resets at the end of the semester and any remaining credits are removed. The College's pay-for-print system monitors printing on all printers (including those in general access labs, library printers, Tutoring Services, Campus Center Lounge and technology labs). Be sure to log OUT of the system when you've finished your printing, to prevent unauthorized access to your account. 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 Help Desk at 741-5696 to have a special account set up. 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 Help Desk at 741-5696 or send an e-mail to helpdesk@smccme.edu.

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.

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, usually 75 percent of course meeting times; please check with the Registration Office. To withdraw from a course, a student must complete and submit the appropriate course withdrawal form, available at the Registration Office. This process must be completed either in person or by using SMCC e-mail accounts.

Plagiarism Statement (to include online cheating)

If an instructor suspects that a student has knowingly committed a violation defined in the Maine Community College System Policy on Student Grade Appeals and Academic Misconduct, the instructor has the authority to review the alleged misconduct and determine the grade that the student should receive for the assignment and the course. The instructor may assign a failing grade for the assignment or course and may require the student to complete additional work for the course. The instructor may consult with the department chair and/or the College's chief academic officer prior to making such decisions. If a student seeks to challenge an instructor's determination, the student should submit a grade appeal. Grade appeal forms are available in the Advising Office on the South Portland Campus or in the administrative offices in the Learning Commons on the Midcoast Campus. An instructor may also refer the matter to the College's disciplinary officer for review under the procedures of the MCCS Student Code of Conduct.