College of San Mateo
Course Outline

☐ New Course
☐ Update/No change
☒ Course Revision (Minor)
☐ Course Revision (Major)

Date: November 12, 2010

Department: PHYS **Number:** 210

Course Title: General Physics I **Units:** 4.0

Total Semester Hours **Lecture:** 48 **Lab:** 48 **Homework:** 80 **By Arrangement:** 16

Length of Course
- ☒ Semester-long
- ☐ Short course (Number of weeks___)
- ☐ Open entry/Open exit

Grading
- ☒ Letter
- ☐ Pass/No Pass
- ☐ Grade Option (letter or Pass/No Pass)

Faculty Load Credit (To be completed by Division Office; show calculations.)**:**

3FLC lecture: 3 hrs/weekX16 weeks/16 =3 FLC

FLC lab: (3 hrsx16weeks/16) x 0.8 = 2.4FLC **Total FLC: 5.4**

1. Prerequisite (Attach Enrollment Limitation Validation Form.)

Completion of MATH 130 with grade of C or higher or appropriate placement test score and other measures as appropriate, or equivalent.
Successful completion of PHYS 150 or equivalent.

2. Corequisite (Attach Enrollment Limitation Validation Form.)

3. Recommended Preparation (Attach Enrollment Validation Form.)

4. Catalog Description (Include prerequisites/corequisites/recommended preparation. For format, please see model course outline.)

Minimum of 48 lecture and 48 lab hours plus 16 hours by arrangement per term. Prerequisites: Completion of MATH 130 with grade of C or higher or appropriate placement test score and other measures as appropriate, or equivalent.
Successful completion of PHYS 150 or equivalent. Topics covered include: Kinematics, Newton's Laws of Motion, Work and Energy, Momentum, Rotational Motion, Mechanical Equilibrium with Skeletal/Muscular Applications, Fluids, Thermodynamics, Waves and Sound. (AA: Area E5a, CSU: Area B1/B3, UC: Area 5A)

5. Class Schedule Description (Include prerequisites/corequisites/recommended preparation. For format, please see model course outline.)

Prerequisite: Completion of MATH 130 with grade of C or higher, or appropriate placement test score and other measures as appropriate, or equivalent. Successful completion of PHYS 150 or equivalent. Plus minimum 16 hours by arrangement per term. Kinematics, Newton's Laws of Motion, Work and Energy, Momentum, Rotational Motion, Mechanical Equilibrium with Skeletal/Muscular Applications, Fluids, Thermodynamics, Waves and Sound. (AA: Area E5a, CSU: Area B1/B3, UC: Area 5A)

6. Student Learning Outcomes (Identify 1-6 expected learner outcomes using active verbs.)

Upon successful completion of the course, the student will be able to:

#1: Identify problems that should be solved using Newton's Laws of Motion and correctly solve them.

#2: Identify problems that should be solved using the Work-Energy Theorem and correctly solve them.

#3: Identify problems that should be solved using Conservation of Momentum (Linear and Angular) and correctly solve them.

#4: Identify and correctly solve problems involving ideal gases. This may include defining an ideal gas, using the ideal gas law (equation of state), problems involving work and energy, distribution of speeds, definition of temperature, explanation of Cv for a diatomic gas, and identifying whether a cycle is a heat engine or not and computing its efficiency.

#5. Identify problems that should be solved using the First and/or Second Law of Thermodynamics and correctly solve them.

#6 .Collect and analyze data to verify physics principles.

7. Course Objectives (Identify specific teaching objectives detailing course content and activities. *For some courses, the course objectives will be the same as the student learning outcomes. In this case, "Same as Student Learning Outcomes" is appropriate here.)*

Course specific objectives are the same as "Student Learning Outcomes"

General objectives: Upon completion of this course, the student will be better able to:

A. Recognize some of the fundamental laws of nature and express them in mathematical form.

B. Apply the laws of nature to the solution of problems. State the range of validity of each law, express the relevant law(s) in mathematical form appropriate to the specific problem, and solve the resultant equation(s) for the unknown quantity or quantities.

C. Use the language and notation of physics correctly. Communicate explanations of physical phenomena in writing.

D. Demonstrate good problem-solving habits, including:

1) organizing given information and determining which physical principles apply to the problem.

2) considering a variety of approaches to a given problem, and selecting one that is appropriate.

3) estimating solutions and recognizing unreasonable results.

4) interpreting solutions correctly, and answering the questions that were actuallyasked.

E. Develop skill in laboratory procedures, including:

1) explain the purpose of each experiment,

2) correctly use laboratory equipment,
3) record data with proper attention to units and significant figures.
4) Analyze data and draw conclusions.
5) Write clear and concise lab reports.

8. **Course Content** (Brief but complete topical outline of the course that includes major subject areas [1-2 pages]. Should reflect all course objectives listed above. In addition, a sample course syllabus with timeline may be attached.)

See attached Course Content

9. **Representative Instructional Methods** (Describe instructor-initiated teaching strategies that will assist students in meeting course objectives. Describe out-of-class assignments, required reading and writing assignments, and methods for teaching critical thinking skills. **If hours by arrangement are required, please indicate the additional instructional activity which will be provided during these hours, where the activity will take place, and how the activity will be supervised.**)

The following methodologies are appropriate. Individual faculty will use whatever mix of these they find most effective.

1. Lecture: Introduce and explain the concepts, define the appropriate terms, provide examples and solve problems to illustrate the application of the concepts.
2. Demonstrations: Use physical demonstrations to reinforce the understanding of the physical concepts
3. Collaborative learning: Guided discussions and in class exercises, which lead to clarification of the concepts and sharpen the problem solving skills.
4. Homework assignments: Outside of classroom problem solving which helps further student understanding of concepts, including the range of validity, and develops the ability to apply the concepts.
5. Laboratory work: Group and individual work to investigate physical principles; observe, record, and analyze the results of experiments, which deepens the understanding of concepts introduced during in lecture.

The following types of assignments are appropriate. Individual faculty will use whatever mix of these they find most effective:

1. Reading the textbook to restate lecture and clarify the key points and concepts.
2. Solving problems.
3. Writing laboratory reports for the experiments performed during the lab and reporting the results and analysis of the experiments.

Hours by arrangement will be completed in the Integrated Science Center or in one of the physics lab rooms with the instructor in the course. Typical activities may include:

1. Guided problem solving to prepare students to solve problems by themselves.
2. Short experimental exercises and analysis to increase students' understanding of material covered in lecture.
3. Review sessions before exams.
4. Other activities as determined by the instructor.

10. **Representative Methods of Evaluation** (Describe measurement of student progress toward course objectives. Courses with required writing component and/or problem-solving emphasis must reflect critical thinking component. If skills class, then applied skills.)

Instructors have considerable discretion in determining course grades. However, the department expects that in class tests and quizzes account for at least 40% of the final

grade, a comprehensive final exam accounts for at least 20%, laboratory reports account for about 20%, and out of class homework assignments account for 10 to 20 %.

1. **Tests** are designed to assess students' conceptual understanding of the material as well as their problem solving skills, logical reasoning, and analytical thinking.
2. **Lab reports** assess students' methods, careful recording of observations and data measurements, correctness of calculations, and critical thinking to clearly evaluate results and draw conclusions. Furthermore, these reports evaluate students' ability to communicate their results in clear writing.
3. Out-of-class homework assignments are an important tool in student learning. Graded homework assignments allow students to receive feedback from instructors on their understanding and misunderstanding of the material before they are required to demonstrate their understanding on the exams

11. Representative Text Materials (With few exceptions, texts need to be current. Include publication dates.)

Cutnell and Johnson, Physics, 8th edition, John Wiley & Sons, Inc, 2009.
Physics 210 Lab Manual, CSM Physics Department (revised yearly) available online at http://www.collegeofsanmateo.edu/physics

Prepared by: _____
(Signature)

Email address: uchida@smccd.edu

Submission Date: November 17, 2010_____