SUFFOLK COUNTY COMMUNITY COLLEGE

COLLEGE COURSE SYLLABUS FORM

To meet the ideals of Suffolk County Community College, new courses should, if appropriate, consider issues arising from elements of cultural diversity in areas of textbook choice, selection of library and audio-visual materials, and teaching methodology. (Please note that a course syllabus is not the same as a course outline. A course syllabus outlines the general requirements for a course. A course outline is the specific document created by the individual faculty member to distribute to a specific course section. Please see the Faculty Handbook for further details as to what to include in a course outline. A SAMPLE course outline should be attached below.)

I. Course Number and Title:

(Be sure to consider whether this course is a 100- or 200-level course and give a rationale for the decision.)

PHY130 Physics 1

II. Catalog Description:

PHY130: Basic course in sequence of courses offered to majors in physical sciences, mathematics and engineering. Includes vectors, kinematics, dynamics, rotational kinematics and dynamics, gravitation and fluids. (4 hrs. lecture/ recitation.) Prerequisite: MAT141. Corequisites: MAT142, PHY132.
Note: Fulfills SUNY General Education Requirement for Natural Sciences.

III. *Learning Outcomes: *(Main concepts, principles, and skills you want students to learn from this course)*

Upon completion of this course, students will be able to:

A. Apply the laws of classical mechanics for solids and fluids in areas of linear kinematics and dynamics, force and work/energy concepts, conservation of linear and angular momentum, rotational kinematics and dynamics.
B. Use differential and integral calculus throughout the course in formulating principles and solving problems.
C. Interpret and manipulate graphical data including fits to linear and quadratic functions.
D. Apply critical thinking skills in analyzing multi-step word problems and formulating solutions.
E. Understand classical mechanics at a level comparable to that offered at four-year institutes in order to successfully transfer into competitive engineering/science programs.

IV. Programs that Require this Course: *(List or indicate none.)*

- Engineering Science / A.S. Degree
- Liberal Arts and Sciences: Science Emphasis – Physics option / A.S. Degree
- Liberal Arts and Sciences: Science Emphasis – Chemistry option / A.S. Degree
- Liberal Arts and Sciences: Science Emphasis – Astronomy option / A.S. Degree

ALL FORMS MUST BE SUBMITTED ELECTRONICALLY

- Liberal Arts and Sciences: Science Emphasis – Geology option / A.S. Degree
- Liberal Arts and Sciences: Science Emphasis – Environmental Science Forestry option / A.S. Degree

V. Major Topics Required:

A. Kinematics of One and Two-dimensional Motion
B. Vector Algebra, Vector Cross and Dot Products
C. Dynamics: Newton's Laws of Motion and Gravity (point sources) and application to problems
D. Momentum, Impulse, Collisions, Conservation of Linear Momentum
E. Work, Energy, Power, Conservation of Energy
F. Kinematics and Dynamics of Rotational Motion
G. Angular Momentum, Conservation of Angular Momentum
H. Density, Pressure, Fluid Mechanics

VI. Special Instructions:

A. Prerequisite(s) to this Course: *(List or indicate none)*
MAT141

B. Course(s) that Require this Course as a Prerequisite:
(List courses or indicate none)
PHY230

C. External Jurisdiction: *(List credentialing organization/association if appropriate or indicate none.)*
None.

VII. Supporting Information: *(Examples – newspapers, journals, Internet resources, CD-ROMS, Videos, other teaching materials, textbooks, etc.)*

Required Textbook:
- Physics for Scientists and Engineers, by Giancoli, pub. Pearson

VIII. Optional Topics: *(List or indicate none)*

None.

IX. Evaluation of Student Performance:

List possible methods to be used for evaluating students' achievement of the course's learning outcomes.

Lecture tests/midterm/final, homeworks assignments, quizzes.

ALL FORMS MUST BE SUBMITTED ELECTRONICALLY

COURSE OUTLINE

Course Number and Title: PHY 130 Physics I

1. OUTCOMES OF THE COURSE:

Upon completion of this course, students will be able to:

A. Apply the laws of classical mechanics for solids and fluids in areas of linear kinematics and dynamics, force and work/energy concepts, conservation of linear and angular momentum, rotational kinematics and dynamics.
B. Use differential and integral calculus throughout the course in formulating principles and solving problems.
C. Interpret and manipulate graphical data including fits to linear and quadratic functions.
D. Apply critical thinking skills in analyzing multi-step word problems and formulating solutions.
E. Understand classical mechanics at a level comparable to that offered at four-year institutes in order to successfully transfer into competitive engineering/science programs.

2. PROCEDURES FOR ACCOMPLISHING THESE OUTCOMES:

List of possible methods to be used for achievement of the course's outcomes:

Lectures, classroom discussions, analyzing and solving word problems in-class, assigning & checking homework, use of visual aids (including online videos and/or simulations), demonstrations.

3. STUDENT REQUIREMENTS FOR COMPLETION OF THE COURSE:

List of possible requirements (subject to the specific procedures chosen above) for completion of the course:

- Complete all non-optional lecture tests (STRONGLY REQUIRED).
- Submit periodic homework assignments on time.
- Complete periodic quizzes.
- Read all of the assigned chapters in the textbook.
- Participate in classroom discussions.
- Participate in analyzing and solving analytical problems in class.

4. TEXTBOOK:

Required Textbook:
- Physics for Scientists and Engineers, by Giancoli, pub. Pearson

5. WEEKLY OUTLINE TOPICS TO BE COVERED:

This is a suggested schedule, with exams. Instructors always have the flexibility to adjust the timeline of this schedule and number of exams according to their needs. However, the topics listed below should be followed closely.

Week 1	• Introduction to measurements and uncertainty; significant figures; units, converting units; dimensional analysis. • Definition of a reference frame; scalars and vectors; displacement, velocity, acceleration
Week 2	• Motion at constant acceleration; freely falling objects; graphical analysis
Week 3	• Operations with vectors; unit vector; vector kinematics • Projectile motion
Week 4	Exam • Force; Newton's Laws of motion; weight; free-body diagrams; problem solving
Week 5	• Applications of Newton's laws with friction • Uniform circular motion
Week 6	• Applications of uniform circular motion (centripetal acceleration and force) • Brief introduction to Newton's Law of Gravitation; satellites and "weightlessness"
Week 7	Exam • Work done; scalar product; work-energy principle; types of forces and energies
Week 8	• Conservation of energy; power
Week 8-9	• Momentum; impulse; conservation of momentum; types of collisions; two-dimensional collisions
Week 10	Exam • Introduction to angular quantities
Week 11	• Torque; moment of inertia; rotational kinetic energy; rotational plus translational motion
Week 12-13	• Angular momentum; cross product; conservation of angular momentum
Week 13-14	• Fluids: density; pressure; buoyancy
Week 14	• Fluids: Equation of continuity; Bernoulli's equation
Week 15	Exam(s)

6. LIST OF SUPPLEMENTARY READINGS:

None.