



**ESSEX COUNTY COLLEGE**  
**Biology, Chemistry and Physics Division**  
**PHY 101 – College Physics I**  
**Course Outline**

**Course Number & Name:** PHY 101 College Physics I

**Credit Hours:** 4.0    **Contact Hours:** 6.0    **Lecture/Lab:** 6.0    **Other:** N/A

**Prerequisites:** Grade of “C” or better in MTH 100 or placement

**Co-requisites:** MTH 113 or MTH 119 is recommended

**Instructor:** TBA

**Email:** TBA

**Office Hours:** By appointment

---

**Course Description:** This is the first half of a standard college physics sequence for technology, architecture, or biological science majors. Lecture and laboratory work is supported by individual assistance and computer activities. This course includes the study of kinematics, dynamics, momentum, energy, circular motion, universal gravitation, rotational motion, the structure of materials, and fluids.

**Textbook:** *Physics*, 10<sup>th</sup> edition, by John Cutnell and Kenneth Johnson, published by John Wiley & Sons, Inc. ISBN: 9781119149071

Lab Manual: *Lab Book for Physics 101* by A. Ruggiero (will be provided by instructor)

Scientific calculator and graph paper

**General Education Goals:** PHY 101 is affirmed in the following General Education Foundation Category: Scientific Knowledge and Reasoning. The corresponding General Education Goal is as follows: Students will use the scientific method of inquiry through the acquisition of scientific knowledge.

**Course Goals:** Upon successful completion of this course, students should be able to do the following:

1. Translate quantifiable problems into mathematical terms and solve these problems using mathematical or statistical operations;
2. Use the scientific method to analyze a problem and draw conclusions from data and observations;

3. Use accurate terminology and notation in written and/or oral form to describe and explain the sequence of steps in the analysis of a particular physical phenomenon or problems in the area of mechanics;
4. Perform laboratory experiments where natural world phenomena will be observed and measured.

**Measurable Course Performance Objectives (MPOs):** Upon successful completion of this course, students should specifically be able to do the following:

1. Translate quantifiable problems into mathematical terms and solve these problems using mathematical or statistical operations:

- 1.1 *read and interpret physical information;*
- 1.2 *interpret and utilize graphical information;*
- 1.3 *use and convert units which measure length, time and mass between the U.S. Customary System and the International System;*

*identify the correct expressions necessary to solve problems; and*

- 1.5 *use basic algebraic and trigonometric mathematical reasoning as appropriate to solve problems*

2. Use the scientific method to analyze a problem and draw conclusions from data and observations:

- 2.1 *use data collected in the laboratory experiments to construct graphs and charts;*
- 2.2 *analyze data to show the relationship between measured values and dependent variables;*
- 2.3 *explain how the results verify, or in some cases, do not seem to verify the particular hypothesis tested in the experiment; and*
- 2.4 *communicate the results by writing laboratory reports using the computer*

3. Use accurate terminology and notation in written and/or oral form to describe and explain the sequence of steps in the analysis of a particular physical phenomenon or problems in the area of mechanics:

- 3.1 *fully describe motion and changes of motion, including projectile motion and circular motion, in terms of quantities which are measured or calculated;*
- 3.2 *draw free-body diagrams, analyze forces and calculate how the net force affects objects in terms of reactions, motion, and rotation;*
- 3.3 *analyze and calculate work and energy as well as their relationship, including conservation of energy;*
- 3.4 *analyze and calculate impulse and momentum as well as their relationship, including conservation of momentum; and*
- 3.5 *construct graphs and charts, interpret them, and utilize them to solve problems*

4. Perform laboratory experiments where natural world phenomena will be observed and measured:

- 4.1 *use various appropriate equipment to measure and observe natural world phenomena;*
- 4.2 *work independently and also as member of a group; and*
- 4.3 *minimize errors in data collecting*

**Methods of Instruction:** Instruction will consist of a combination of lectures, class discussions, classroom demonstrations, laboratory experiments, board work, group work and individual study.

**Outcomes Assessment:** Test and exam questions are blueprinted to course objectives. Data is collected and analyzed to determine the level of student performance on these assessment instruments in regards to meeting course objectives. The results of this data analysis are used to guide necessary pedagogical and/or curricular revisions.

**Course Requirements:** All students are required to:

1. Complete all homework assignments before each class.
2. Take part in class discussion and do problems on the board when required.
3. Come prepared for each lab, having read the material ahead of time.
4. Perform all laboratory experiments, analyze data and write lab reports.
5. Complete all tests and exams in class or make up missed tests, if permitted.

**Attendance Policy:** Regular and prompt attendance is essential for academic success. Faculty members take attendance at each scheduled class session. Students are expected to attend and be on time for all classes. Individual faculty members may establish specific attendance policies. Attendance records will be turned in to the appropriate Division/Department Chair and/or Program Director at the end of the term and in the interim upon request. Any students with more than three unexcused absences will automatically fail the course.

**Methods of Evaluation:** Final course grades will be computed as follows:

<b>Grading Components</b>	<b>% of final course grade</b>
<ul style="list-style-type: none"> <li>• <b>Homework and Quizzes</b> Students will be expected to analyze and solve problems that indicate the extent to which they master course objectives.</li> </ul>	<b>5 – 10%</b>
<ul style="list-style-type: none"> <li>• <b>Laboratory Reports</b> Students will be expected to show that they have read assigned lab manual sections, can follow written procedures,</li> </ul>	<b>10 – 20%</b>

measure and record data, perform calculations and write reports including all specified components.

- 40 – 60%**

• **Tests** (dates specified by the instructor)  
 Tests show evidence of the extent to which students meet the course objectives, including but not limited to identifying and applying concepts, analyzing and solving problems, estimating and interpreting results and stating appropriate conclusions using correct terminology.
  
- 15 – 30%**

• **Final Exam**  
 The **comprehensive** final exam will examine the extent to which students have understood and synthesized all course content and achieved all course objectives.

Note: The instructor will provide specific weights, which lie in the above-given ranges, for each of the grading components at the beginning of the semester.

**Grading System:**

<b>A</b>	<b>90% - 100%</b>	<b>Superior</b>
<b>B+</b>	<b>87% - 89%</b>	<b>Very Good</b>
<b>B</b>	<b>80% - 86%</b>	<b>Good</b>
<b>C+</b>	<b>77% - 79%</b>	<b>Above Average</b>
<b>C</b>	<b>70% - 76%</b>	<b>Satisfactory</b>
<b>D</b>	<b>60% - 69%</b>	<b>Passing</b>
<b>F</b>	<b>59% - 0</b>	<b>Failing</b>

**Academic Integrity:** Dishonesty disrupts the search for truth that is inherent in the learning process and so devalues the purpose and the mission of the College. Academic dishonesty includes, but is not limited to, the following:

- plagiarism – the failure to acknowledge another writer’s words or ideas or to give proper credit to sources of information;
- cheating – knowingly obtaining or giving unauthorized information on any test/exam or any other academic assignment;
- interference – any interruption of the academic process that prevents others from the proper engagement in learning or teaching; and
- fraud – any act or instance of willful deceit or trickery.



Violations of academic integrity will be dealt with by imposing appropriate sanctions. Sanctions for acts of academic dishonesty could include the resubmission of an assignment, failure of the test/exam, failure in the course, probation, suspension from the College, and even expulsion from the College.

**Student Code of Conduct:** All students are expected to conduct themselves as responsible and considerate adults who respect the rights of others. Disruptive behavior will not be tolerated. All students are also expected to attend and be on time all class meetings. No cell phones or similar electronic devices are permitted in class. Please refer to the Essex County College student handbook, *Lifeline*, for more specific information about the College's Code of Conduct and attendance requirements.

**Course Content Outline:** This is a tentative course schedule, the instructor reserve the right to make changes on it to make it better for the student`s development. Notice will be given should any changes take place.

<b>Class Meeting (180 minutes)</b>	<b>Chapter / Section</b>
1-2	Orientation & Course Introduction/Review of Class Syllabus
3	1 ( 1 – 8) The nature of Physics, units, the role of units in problem solving, trigonometry, scalars and vectors, vector addition and subtraction, the components of vectors, addition of vectors by means of components
4-5	<b>Lab 1</b> Vectors Review and problem solving for Test 1
	<b>Lab 2</b> Measurements
	<b>Test 1</b> on Chapter 1
6-7	2 (1-3, 7) Displacement, speed and velocity, acceleration, graphical analysis of velocity and acceleration
	2(4-6) Equations of kinematics for constant acceleration, applications of the equations of kinematics, freely falling bodies
8-9	3 (1-3) Displacement, velocity and acceleration, equations of kinematics in two dimension, projectile motion
	<b>Lab 3</b> Speed Review and problem solving for Test 2
10-11	<b>Test 2</b> on Chapters 2 & 3
	<b>Lab 4</b> Acceleration
	4 ( 1-5) The concepts of force and mass, Newton`s First Law of Motion, Newton`s Second law of motion, the vector nature of Newton`s Second Law of motion, Newton`s Third law of motion
12-13	4 (7) The gravitational force
	<b>Lab 5</b> Net force and acceleration
	4 (6, 8-11) Types of forces: an overview, the normal force, static and kinetic frictional forces, the tension force, equilibrium applications of Newton`s laws of motion,
13-14	4 (12) Non-equilibrium applications of Newton`s laws of motion
	<b>Lab 6</b> Newton`s Second Law
	5 (1-6) Uniform circular motion, centripetal acceleration, centripetal force, banked curves, satellites in circular orbits, apparent Weightlessness and artificial Gravity

<b>Class Meeting (180 minutes)</b>	<b>Chapter / Section</b>	
15-16	6 (1,2)	Work done by a constant force, the Work – Energy theorem and kinetic energy Review and problem solving for Test 3
	<b>Test 3</b>	on Chapters 4 & 5
	6 (3-5)	Gravitational potential energy, conservative versus non-conservative forces, the conservation of mechanical energy
17-18	6 (6, 7, 9)	Non-conservative forces and the work – kinetic energy theorem, power, work done by a variable force
	7 (1-3)	The Impulse – Momentum theorem, power, work done by a variable force Review and problem solving for test 4
19-20	<b>Test 4</b>	Chapters 6 & 7
	<b>Lab 7</b>	Conservation of momentum
	8 (1-5)	Rotational motion and angular displacement, angular velocity and angular acceleration The equations of rotational kinematics. angular variables and tangential variables, centripetal acceleration and tangential acceleration
21-22	9 (1,2)	The actions of force and torques on rigid bodies, rigid objects in equilibrium
	11 (1-6)	Mass density, pressure, pressure and depth in a static fluid, pressure gauges, Pascal’s principle, Archimedes’ principle
23-24	<b>Test 5</b>	on Chapters 8, 9 & 11 (sections 1 - 6)
	11 (1, 8, 10)	Fluids in motion (time permitting), the equation of continuity (time permitting), applications of Bernoulli’s equation (time permitting)
25		Review for Final Exam
26	<b>Final Exam</b>	Comprehensive <b>Final Exam</b> on all course material covered