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:** 4.0 **Lecture/Lab:** 4.0 **Other:** N/A

Prerequisites: Grade of "C" or better in MTH 100 or placement

Co-requisites: MTH 113 or MTH 119 is recommended

Instructor: Nadia Lvov

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*, 10th 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.

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

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:

Grading Components	% of final course grade
• Tests 1-4	50 %
• Final Exam	25 %
• Lab Average	15 %
• Homework	10 %
Total	100 %

Grading System:

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

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.

Course Content Outline: based on the text **Physics**, 10th edition, by John Cutnell and Kenneth Johnson; published by John Wiley & Sons, Inc.; ISBN #: 9781119149071; and the lab manual **Lab Book for Physics 101** by A. Ruggiero and M. C. Rozak

Class Meeting (120 minutes)	Chapter/Section	
	CHAPTER 1 INTRODUCTION AND MATHEMATICAL CONCEPTS	
1	1.1	The Nature of Physics
	1.2	Units
	1.3	The Role of Units in Problem Solving
	1.4	Trigonometry
2	1.5	Scalars and Vectors
	1.6	Vector Addition and Subtraction
	1.7	The Components of Vectors
	1.8	Addition of Vectors by Means of Components
3	Review & Problem Solving for Test #1	
	Lab #1 Measurements	
4	**Test #1** on Chapter 1	
	CHAPTER 2 KINEMATICS IN ONE DIMENSION	
5	2.1	Displacement
	2.2	Speed and Velocity
	2.3	Acceleration
	2.7	Graphical Analysis of Velocity and Acceleration
6	2.4	Equations of Kinematics for Constant Acceleration
	2.5	Applications of the Equations of Kinematics
	2.6	Freely Falling Bodies
	CHAPTER 3 KINEMATICS IN TWO DIMENSIONS	
7	3.1	Displacement, Velocity, and Acceleration
	3.2	Equations of Kinematics in Two Dimensions

Class Meeting (120 minutes)	Chapter/Section	
	3.3	Projectile Motion
8	**Lab #3**	Speed
	Review & Problem Solving for Test #2	
9	**Test #2**	on Chapters 2 & 3
	CHAPTER 4 FORCES AND NEWTON'S LAWS OF MOTION	
10	4.1	The Concepts of Force and Mass
	4.2	Newton's First Law of Motion
	4.3	Newton's Second Law of Motion
	4.4	The Vector Nature of Newton's Second Law of Motion
	4.5	Newton's Third Law of Motion
11	4.7	The Gravitational Force
	Lab #5	Net Force and Acceleration
12	4.6	Types of Forces: An Overview
	4.8	The Normal Force
	4.9	Static and Kinetic Frictional Forces
	4.10	The Tension Force
	4.11	Equilibrium Applications of Newton's Laws of Motion
13	4.12	Non-equilibrium Applications of Newton's Laws of Motion
	Lab #6	Newton's Second Law
	CHAPTER 5 DYNAMICS OF UNIFORM CIRCULAR MOTION	
14	5.1	Uniform Circular Motion
	5.2	Centripetal Acceleration
	5.3	Centripetal Force
	5.4	Banked Curves
	5.5	Satellites in Circular Orbits
	CHAPTER 6 WORK AND ENERGY	
15	6.1	Work Done by a Constant Force
	6.2	The Work-Energy Theorem and Kinetic Energy
	Review & Problem Solving for Test #3	
16	**Test #3**	on Chapters 4 & 5
17	6.3	Gravitational Potential Energy
	6.4	Conservative Versus Non-conservative Forces
	6.5	The Conservation of Mechanical Energy
	6.6	Non-conservative Forces and the Work-Kinetic Energy Theorem
18	6.7	Power
	6.9	Work Done by a Variable Force

Class Meeting (120 minutes)	Chapter/Section
	CHAPTER 7 IMPULSE AND MOMENTUM
19	7.1 The Impulse-Momentum Theorem
	7.2 The Principle of Conservation of Linear Momentum
	7.3 Collisions in One Dimension
	Review & Problem Solving for Test #4
	Lab #7 Conservation of Momentum
20	**Test #4** on Chapters 6 & 7
	CHAPTER 8 ROTATIONAL KINEMATICS
21	8.1 Rotational Motion and Angular Displacement
	8.2 Angular Velocity and Angular Acceleration
	8.3 The Equations of Rotational Kinematics
	8.4 Angular Variables and Tangential Variables
	8.5 Centripetal Acceleration and Tangential Acceleration
	CHAPTER 9 ROTATIONAL DYNAMICS
22	9.1 The Actions of Force and Torque on Rigid Bodies
	9.2 Rigid Objects in Equilibrium
	9.2 Rigid Objects in Equilibrium (continued)
	CHAPTER 11 FLUIDS
23	11.1 Mass Density
	11.2 Pressure
	11.3 Pressure and Depth in a Static Fluid
	11.4 Pressure Gauges
	11.5 Pascal's Principle
	11.6 Archimedes' Principle
24	Comprehensive **Final Exam** on all
25	TBA