**STATE UNIVERSITY OF NEW YORK !**
**COLLEGE OF TECHNOLOGY !**
**CANTON, NEW YORK !**


# MASTER SYLLABUS

## COURSE NUMBER – COURSE NAME
## PHYS 115 – BASIC PHYSICS

**Created by: Feng Hong**

**Updated by: Feng Hong**

**Canino School of Engineering Technology**

**Department: PHYSICS**

**Semester/Year: Fall/2018**

**A.** **TITLE**: Basic Physics

**B.** **COURSE NUMBER:** PHYS 115

**C.** **CREDIT HOURS: (Hours of Lecture, Laboratory, Recitation, Tutorial, Activity)**

**# Credit Hours:** 4 !
**# Lecture Hours:** 4 **per week** !
**# Lab Hours:** **per week** !
**Other:** **per week**

**Course Length:** 15 **Weeks**

**D.** **WRITING INTENSIVE COURSE**: Yes ☐ No ☒

**E.** **GER CATEGORY: None:** ☐ **Yes:** GER 2 Natural Sciences !
***If course satisfies more than one*:** GER !

**F.** **SEMESTER(S) OFFERED: Fall** ☐ **Spring** ☐ **Fall & Spring** ☒

**G.** **COURSE DESCRIPTION:**

Topical coverage includes systems of units, scientific method, scientific mathematics ! (including basic trigonometric functions), vectors, friction, forces and translational equilibrium, torques and rotational equilibrium, uniformly accelerated motion, Newton's Laws, work, energy, and power. Emphasis is on development of laboratory and problem-solving skills including description, organization, analysis, summarization, and criticism in accordance with the scientific ! method. !

**H.** **PRE-REQUISITES: None** ☐ **Yes** ☒ **If yes, list below:**

MATH 100 (Beginning Algebra) or permission of instructor

**CO-REQUISITES: None** ☒ **Yes** ☐ **If yes, list below:**

## I. STUDENT LEARNING OUTCOMES: (*see key below*)

By the end of this course, the student will be able to:

| ***Course Student Learning Outcome [SLO]*** | ***Program Student Learning Outcome [PSLO]*** | ***GER*** *[If Applicable]* | ***ISLO & SUBSETS*** | |
|---|---|---|---|---|
| a. Understand the methods scientists use to explore natural phenomena, including observation, hypothesis development, measurement, and data collection, experimentation, evaluation of evidence, and employment of mathematical analysis | N/A | Understanding of the methods scientists use to explore natural phenomena, including observation, hypothesis development, measurement and data collection, experimentation, evaluation of evidence, and employment of mathematical analysis | 2-Crit Think<br>ISLO<br>ISLO | CA<br>Subsets<br>Subsets<br>Subsets |
| b. Apply scientific data, concepts, and models in physics | N/A | Application of scientific data, concepts, and models in one of the natural sciences | ISLO<br>2-Crit Think<br>ISLO | Subsets<br>PS<br>Subsets<br>Subsets |
| c. Solve problem in the physical sciences in a logical, defendable manner | N/A | Application of scientific data, concepts, and models in one of the natural sciences | 2-Crit Think<br>ISLO<br>ISLO | PS<br>Subsets<br>Subsets<br>Subsets |
| d. Demonstrate how the various topics of physics are related to everyday life | N/A | Application of scientific data, concepts, and models in one of the natural sciences | 1-Comm Skills<br>2-Crit Think<br>ISLO | W<br>PS<br>Subsets<br>Subsets |
| | | | ISLO<br>ISLO<br>ISLO | Subsets<br>Subsets<br>Subsets<br>Subsets |

| KEY | **Institutional Student Learning Outcomes [ISLO 1 – 5]** |
|---|---|
| **ISLO #** | **ISLO & Subsets** |
| **1** | **Communication Skills**<br>Oral [O], Written [W] |
| **2** | **Critical Thinking**<br>*Critical Analysis [CA] , Inquiry & Analysis [IA] , Problem Solving [PS]* |
| **3** | **Foundational Skills**<br>*Information Management [IM], Quantitative Lit,/Reasoning [QTR]* |
| **4** | **Social Responsibility**<br>*Ethical Reasoning [ER], Global Learning [GL], Intercultural Knowledge [IK], Teamwork [T]* |
| **5** | **Industry, Professional, Discipline Specific Knowledge and Skills** |

*Include program objectives if applicable. Please consult with Program Coordinator !

**J. APPLIED LEARNING COMPONENT:** Yes ☒ No ☐

If YES, select one or more of the following categories:

☒ Classroom/Lab
☐ Internship
☐ Clinical Placement
☐ Practicum
☐ Service Learning
☐ Community Service
☐ Civic Engagement
☐ Creative Works/Senior Project
☐ Research
☐ Entrepreneurship (program, class, project)

**K. TEXTS:**

Douglas C. Giancoli. Physics curriculum: Physics Principles with Applications. Upper Saddle River, NJ: Pearson Education.

**L. REFERENCES:**

None

**M. EQUIPMENT: None** ☐ **Needed:** A twelve inch (12 “) clear, flexible, plastic ruler with a centimeter/millimeter scale. A protractor. A simple inexpensive scientific calculator with trigonometric and inverse trigonometric functions. A solar powered calculator is recommended.

**N. GRADING METHOD:** A-F

**O. SUGGESTED MEASUREMENT CRITERIA/METHODS:**

- **Exams**
- **Quizzes**
- **Homework**
- **Projects**

**P. DETAILED COURSE OUTLINE:**

**I. Introduction**
- **A. Definition of physics**
- **B. Motivation for studying physics**

**II. Mathematics for physics**
- **A. Algebra**
- **B. Scientific notation**
- **C. Graphs**
- **D. Plane geometry**
- **E. Right triangle trigonometry**

**III. Measurements in physics**
- **A. Fundamental quantities and units**
- **B. Prefixes**
- **C. Significant figures and uncertainty**
- **D. Unit conversion**

**IV. Vectors**

- **A. Scalar and vector quantities**
- **B. Graphical methods of vector addition**
- **C. Vector components**
- **D. Vector resultants**
- **E. Analytic vector addition**
- **F. Subtraction of vectors**

**V. One Dimensional Motion**

- **A. Speed versus velocity**
- **B. Acceleration**
- **C. Uniform acceleration**
- **D. One-dimensional uniformly accelerated motion problems and solution methods**
- **E. Falling bodies**

**VI. Two-Dimensional Motion**

- **A. Horizontal and vertical components of projectile motion**
- **B. Range, maximum height, and time of flight**

**VII. Translational Equilibrium**

- **A. Newton's laws**
- **B. Translational equilibrium**
- **C. Free-body diagrams**
- **D. Translational equilibrium problems and methods of solution**
- **E. Friction**

**VIII. Newton's Second Law**

- **A. Force, mass, and acceleration: mathematical relationships**
- **B. Mass, weight, and the acceleration of gravity, free-body diagrams for constant acceleration**

**X. Work and Energy**

- **A. Work**
- **B. Kinetic Energy, Potential Energy and the Work-Energy Theorem**

**XI: Electricity**

- **A. Resistance**
- **B. Current**
- **C. Ohm's Law**
- **D. Electric Power**

**XII: Light**

- **A. Law of Reflection**
- **B. Lawof Refraction**
- **C. Image Formation**

**Q. <u>LABORATORY OUTLINE</u>: None ☒ Yes ☐**