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

MASTER SYLLABUS

COURSE NUMBER – COURSE NAME
PHYS 137 – UNIVERSITY PHYSICS LABORATORY III

Created by: Dr. Lawretta Ononye

Updated by: Dr. Lawretta Ononye

Canino School of Engineering Technology !

Department: Physics !

Semester/Year: Fall 2018 !

A. **TITLE**: University Physics Laboratory III

B. **COURSE NUMBER:** PHYS 137

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

 # Credit Hours: 1
 # Lecture Hours: 1 **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:**

This laboratory course is to accompany University Physics III (PHYS 133). The student will perform experiments related to rotational motion, oscillations and waves, static equilibrium, properties of material, and thermal physics.

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

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

PHYS 133, University Physics III

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 physical phenomena, including observation, hypothesis development, measurement, data collection, experimentation, evaluation of evidence, and employment of physics analysis.			2-Crit Think 4-Soc Respons 1-Comm Skills	CA T W Subsets
b. Demonstrate an understanding of graphing; and determine the mathematical value of Pi experimentally and compare to known value.			2-Crit Think 4-Soc Respons 1-Comm Skills	CA PS T W
c. Calculate the moment of inertia of a ring and disk from experimental data and develop laboratory report.			1-Comm Skills 2-Crit Think 4-Soc Respons	W CA T Subsets
d. Determine the period of oscillation of an object undergoing simple harmonic motion and simple pendulum, demonstrate an understanding of wave motion. Develop laboratory report.			1-Comm Skills 2-Crit Think 4-Soc Respons	W CA T Subsets
e. Illustrate an understanding of rotational equilibrium of rigid object, and explain the principle of conservation of angular momentum and its physical application.			2-Crit Think 4-Soc Respons 1-Comm Skills	CA T W Subsets

KEY	**Institutional Student Learning Outcomes [ISLO 1 – 5]**
ISLO #	**ISLO & Subsets**
1	**Communication Skills** Oral [O], Written [W]
2	**Critical Thinking** *Critical Analysis [CA] , Inquiry & Analysis [IA] , Problem Solving [PS]*
3	**Foundational Skills** *Information Management [IM], Quantitative Lit,/Reasoning [QTR]*
4	**Social Responsibility** *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:

N/A

L. REFERENCES:

None

M. EQUIPMENT: None ☐ **Needed:** Existing physics laboratory equipment will be used.

N. GRADING METHOD: A-F

O. SUGGESTED MEASUREMENT CRITERIA/METHODS:

- **Lab reports**
- **Participation**
- **Projects**

P. DETAILED COURSE OUTLINE:

N/A

Q. LABORATORY OUTLINE: None ☐ **Yes** ☒

I. Circumference of a Circle and Pi !
The circumference and diameter of different circular objects will measured and !
use to determine the mathematical value of Pi (π). !

II. Moment of Inertia !
The moment of inertia of a ring and a disk will be determined experimentally. !
These dynamic results will be compared to the theoretical moment of inertia !
calculated from the mass and dimensions measurement of the objects. !

III. Conservation of Angular Momentum !
A non-rotating ring will be dropped onto a rotating disk and the final angular !
speed of the system determined and compared with the value predicted using !
conservation of angular momentum formula. !

IV. Static Equilibrium !
When a rigid body is acted on by a system of forces that do not all pass through !
the same point, a change may be produced in the angular (rotational) velocity of !
the body as well as in its linear (translational) velocity. Under certain conditions !
the body will be in equilibrium. This experiment presents a study of the !
conditions for the equilibrium of a rigid body under the action of several forces.

V. Hooke's Law !
The linear behavior of a metal spring will be determined; also, measurement will !
be made on the behavior of something that is not quite ideal (non-linear). !

VI. Simple Harmonic Motion !
Measurements will be made on a pendulum and a mass hanging from a spring to !
determine which variables have the most influence on the period of the motion. !

VII. Waves on Elastic String !
A vibrating string apparatus will be used to determine resonant frequencies of !
waves generated on a string. A frequency generator fed through an amplifier will !
be used to drive the vibrator. !

VIII. Thermal Expansion of Metal !
The coefficient of linear expansion of different metals will be determined. !

IX. Specific Heat and Heat of Fusion !
The amount of energy needed to increase the temperature and change the state of a !
substance will be studied using a calorimeter.