COURSE OUTLINE

PHYS 135 – UNIVERSITY PHYSICS LABORATORY I

Prepared By: Feng Hong

CANINO SCHOOL OF ENGINEERING TECHNOLOGY
PHYSICS
MAY 2015
A. **TITLE**: University Physics Laboratory I

B. **COURSE NUMBER**: PHYS 135

C. **CREDIT HOURS**: 1

D. **WRITING INTENSIVE COURSE**: Yes

E. **COURSE LENGTH**: 15 weeks

F. **SEMESTER(S) OFFERED**: Fall

G. **HOURS OF LECTURE, LABORATORY, RECITATION, TUTORIAL, ACTIVITY**: 
   2 laboratory hours per week

H. **CATALOG DESCRIPTION**: 
   This is a laboratory course to accompany PHYS 131, University Physics I. Experiments will include one and two dimensional translational mechanics and graphical analysis.

I. **PRE-REQUISITES/CO-REQUISITES**: 
   Co-requisite(s): PHYS 131, University Physics I or permission of instructor

J. **GOALS (STUDENT LEARNING OUTCOMES)**: 
   By the end of this course, the student will be able to:

<table>
<thead>
<tr>
<th>Course Objective</th>
<th>Institutional SLO</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Understand the methods scientists use to explore natural phenomena,</td>
<td>1. Communication</td>
</tr>
<tr>
<td>including observation, hypothesis development, measurement, and data collection,</td>
<td>2. Crit. Thinking</td>
</tr>
<tr>
<td>experimentation, evaluation of evidence, and employment of mathematical analysis</td>
<td>4. Inter-Intrapersonal Skills</td>
</tr>
<tr>
<td>b. Application of scientific data, concepts, and models in physics</td>
<td>1. Communication</td>
</tr>
<tr>
<td>c. Use computer assisted data collection and analysis.</td>
<td>2. Crit. Thinking</td>
</tr>
</tbody>
</table>

K. **TEXTS**: N/A


M. **EQUIPMENT**: Existing physics laboratory equipment will be used.

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

O. **MEASUREMENT CRITERIA/METHODS**: 
   - Lab reports
   - Projects
   - Participation
P. **DETAILED COURSE OUTLINE:** N/A

Q. **LABORATORY OUTLINE:**

I. **Graph Plotting and Graphical Analysis**
   Prepared data will be plotted by hand. The same data is then plotted using computer software.

II. **Graphical Analysis**
    Additional graphical analysis will be done with the aid of computers.

III. **Tools for Scientific Thinking - Investigations #1, 2, 3**
    Sonar will be used to relate position and motion with computer generated graphs.

IV. **Force Table**
    Analytical and graphical solutions to vector addition of equilibrium forces will be checked out on a force table.

V. **Tools for Scientific Thinking - Investigation #4**
    Sonar will be used to investigate velocity.

VI. **Tools for Scientific Thinking - Investigations # 5, 6**
    Sonar will be used to investigate acceleration.

VII. **Acceleration of Gravity**
    The acceleration of free falling objects will be determined.

VIII. **Forces and Motion**
    The acceleration of carts along a track and experiencing a constant force is measured.

IX. **Plotting Data – The Spring**
    The behavior of loaded springs is studied.

X. **Measurement and Significant Figures**
    Areas, volumes and time are measured with attention to accuracy and precision.

XI. **Projectile Motion**
    Small plastic balls are fired from a spring gun. Calculated and measured ranges are compared.

XII. **Work and Energy**
    Students will determine the work done on a (nearly) frictionless cart and show that the work done is equal to the increase in kinetic energy of the cart. Furthermore, they will show that the increase in energy of the cart is equal to the decrease in potential energy of the falling weight that supplies the force on the cart.