

THREE RIVERS COMMUNITY COLLEGE
COURSE OUTLINE - Fall 2018
CRN 30295/30296 Fri 11:00-12:40a & 1:00-2:40p Rm B208
Instructor: Robert Lantz (RLANTZ@TRCC.COMMNET.EDU)
Blackboard - (<http://my.commmnet.edu/>)
Unit Conversion - (<http://onlineconversion.com/>)

Course Number/Title: PHY K114 Physics (Mechanics) Lab

Lecture 0 hrs Laboratory 0 hrs Credit 0 hrs Contact 2 hrs

Course Description: Practical Labs involving Classical Newtonian Physics with involvement in Energy / Mass Analysis.
Method/Grading: The Lab Grade will involve 1) Lab Attendance, 2) Data Acquisition, 3) Mathematical Calculations & 4) Formal Lab Reports / Documentations. The Data Acquisition will involve small groups whereas the Formal Lab Report will be from the individual student. No credit will be given for duplicate reports. Students with disabilities should consult with Instructor. Digication Requirement: All students are required to maintain an online learning portfolio in Digication that uses the college template.

Text: Handouts

Prerequisites: _____ Co-Requisites: PHY-K114 Lecture

COURSE TOPICS/CONTENT

	HOURS
1) Introduction, Number System, Accuracy, Precision, Unit Conversions, Unit Analysis, Rounding-----	2
2) Mass Properties, Density, Vernier Caliper, Micrometer, Volume---	2
3) Energy, Potential, Kinetic, Joules, Balance, Law of Energy-----	2
4) Vectors, Resultant, Equilibrium, Force Table-----	2
5) Falling Apple, Newton's Experiment of Falling Objects-----	2
6) Horizontal Acceleration, Air Tracks, Sliders, $F=ma$ Proof-----	2
7) Atwood Machine, Vertical Acceleration, $F=ma$ Proof-----	2
8) Projectile Motion, Horizontal / Vertical Velocity Relations-----	2
9) Friction, Static, Dynamic, Leather on Steel-----	2
10) Pendulum, "g" Calculation of Swinging Pendulum-----	2
11) Non-Concurrent Forces, Equilibrium, Moments, Rotation-----	2
12) Cart on Inclined Plane, Equilibrium, Concurrent forces-----	2
13) Rolling Ball, Changing Velocity, Constant Acceleration, Graphing, Slopes of Graphs, Curve Fitting, Kinetic Energy, Work, Friction--	4
14) Open Lab for Course Wrap-up-----	2

TOTAL HOURS 30

Date: August 27, 2018

Prepared By: Robert Lantz

Program Coordinator: Robert Niedbala

Objectives

The Objectives of this Lab are to Measure, Calculate and then Predict how Matter Behaves under certain conditions. The Basic Natural Laws studied in this Course include:

- 1) Law of Gravity
- 2) Force-Mass-Acceleration Law
- 3) Conservation of Energy Law
- 4) Conservation of Mass Law
- 6) Kinetic Energy Law
- 7) Potential Energy Law
- 8) Work / Friction

Measurable Outcomes

Upon Completion of this Course, the Student will:

1. Be able to understand Units, Accuracy and Precision of Instruments.
2. Be able to make Measurements, read Gauges, & Utilize Instruments to Measure Physical Properties
3. Be able to calculate variables using equations and to Express answers with reasonable accuracy.
4. Be able to calculate the Resultant of several Vectors And to relate Resultant to Equilibrium requirements.
5. Be able to Graph distance vs time and relate slope to the instantaneous velocity.
6. Be able to Graph Velocity vs time and relate slope to the Instantaneous acceleration
7. Be able to use derived equations of constant acceleration to determine distance, time, velocity and acceleration relationships.
8. Be able to analyze free body diagrams to determine resultant Force, and its relationship to the mass and acceleration.
9. Be able to analyze objects in projectile flight to understand how horizontal velocity relates to vertical velocity.
10. Be able to understand friction and how it relates to the normal force acting on the body.
11. Be able to understand "g" and how it relates to the planet & the Universe.
12. Be able to use energy in practical terms with units of Joules.