College of San Mateo
Official Course Outline

1. **COURSE ID:** PHYS 150 **TITLE:** Preparation for Physics
   Units: 4.0 units **Hours/Semester:** 48.0-54.0 Lecture hours; and 48.0-54.0 Lab hours
   Method of Grading: Grade Option (Letter Grade or P/NP)
   Prerequisite: completion of or concurrent enrollment in MATH 130 or appropriate score on the College Placement Test.

2. **COURSE DESIGNATION:**
   Degree Credit
   Transfer credit: none

3. **COURSE DESCRIPTIONS:**
   Catalog Description:
   Review and development of algebra and trigonometry skills required for physics, including vector addition problems. Development of laboratory skills and problem solving skills and application of those skills to kinematics and Newton's Laws of Motion. Designed for students planning to take PHYS 210 or 250.

4. **STUDENT LEARNING OUTCOME(S) (SLO'S):**
   Upon successful completion of this course, a student will meet the following outcomes:
   1. Solve symbolic algebraic equations and systems of equations for specified variables.
   2. Create, critique and analyze scientific graphs with appropriate accuracy.
   3. Solve problems which require vector addition.
   4. Analyze graphs of position, velocity and acceleration and answer qualitative and quantitative questions using the graphs.
   5. Set-up and solve kinematics problems.
   6. Collect and analyze data to verify physics principles.

5. **SPECIFIC INSTRUCTIONAL OBJECTIVES:**
   Upon successful completion of this course, a student will be able to:
   1. Solve symbolic algebraic equations and systems of equations for specified variables.
   2. Create, critique and analyze scientific graphs with appropriate accuracy.
   3. Solve problems which require vector addition
   4. Analyze graphs of position, velocity and acceleration and answer qualitative and quantitative questions using the graphs.
   5. Set-up and solve kinematics problems.
   6. Collect and analyze date to verify physical principals

6. **COURSE CONTENT:**
   Lecture Content:
   1. Pre-Algebra and Basic Algebra Review - Exponents; Roots; Geometrical Formulas; Logarithmic and Exponential Functions; Exponential Growth and Decay; Solving Algebraic Equations
   2. Definition of Kinematic Terms – Simple Calculations using Definitions of Position, Displacement, and Instantaneous and Average Values of Speed, Velocity and Acceleration
   3. Systems of Equations - Review of Intermediate Algebra with a focus on Symbolic Algebra; Solving Systems of Equations encountered in 200-Level Physics Courses
   4. Graphing - Review of Mathematical Graphs; Creating Scientific Graphs; Reading Points off of Graphs; Determining Equations of Lines;
   5. Problem Solving Skills - Translating Sentences into Mathematical Equations, Diagrams, and Physical Models; General Problem Solving Strategies including Setting-Up Problems in a systematic way;
   6. Review of Trigonometry and Vectors - Trigonometry Review with Focus on Right Triangles; Vectors and Vector Components; Vector Addition by Scale Diagram and Component Methods; Comparison of Component Addition of Vectors and Experimental Addition of Vectors
   7. Kinematics - Qualitative and Quantitative Analysis of Position, Velocity and Acceleration Graphs; Kinematics Problem Solving using the definitions of the kinematic variables and the equations of motion for motion with a constant acceleration.
   8. Newton's Laws of Motion - Introduction to Newton's Laws of Motion; Application of Problem Solving Skills using Vectors and Algebra to Solve Newton's Laws Problems

Lab Content:

1. Basic Lab Skills - Scientific Notation; Units and Unit Conversion; Measurement and Measuring Instruments; Physical Intuition; Definitions of Position, Displacement, and Instantaneous and Average Values of Speed, Velocity and Acceleration
2. Graphing - Experiments to gather and graph data to observe or determine a relationship between physical quantities; Physical Interpretation the Slope and Intercept of Scientific Graphs
3. Problem Solving Skills - Translating Sentences into Physical Models;
4. Review of Trigonometry and Vectors - Experimental Addition of Displacement Vectors; Vector Addition by Scale Diagram and Component Methods; Comparison of Component Addition of Vectors and Experimental Addition of Vectors
5. Kinematics - Laboratory Exercises involving generating, interpreting, and performing calculations using graphs of Position, Velocity and Acceleration as functions of Time; Qualitative and Quantitative Analysis of Position, Velocity and Acceleration Graphs;
6. Newton's Laws of Motion – Experiments Verifying Newton's Laws of Motion

7. **REPRESENTATIVE METHODS OF INSTRUCTION:**

Typical methods of instruction may include:

A. Lecture
B. Lab
C. Activity
D. Experiments
E. Other (Specify): Workshop/Collaborative learning Traditional and computer-based laboratory activities

8. **REPRESENTATIVE ASSIGNMENTS**

Representative assignments in this course may include, but are not limited to the following:

Writing Assignments:

A. Written homework assignments
B. Written laboratory exercises

Reading Assignments:

Reading from in-house text.

9. **REPRESENTATIVE METHODS OF EVALUATION**

Representative methods of evaluation may include:

A. Class Participation
B. Exams/Tests
C. Homework
D. Lab Activities

10. **REPRESENTATIVE TEXT(S):**

Other:

A. Preparation For Physics Text, CSM

Origination Date: November 2015
Curriculum Committee Approval Date: January 2016
Effective Term: Fall 2016
Course Originator: David Locke