Montgomery County Community College
PHY 115
Technical Physics
4-3-3

COURSE DESCRIPTION:
This course is a one-semester, algebra-based overview of topics in introductory physics designed for students in the life sciences. Topics include basic principles of motion, mechanics, statics, work and energy, fluid mechanics, sound and waves, thermal physics, electricity, magnetism, light, and optics. The weekly laboratory is designed to reinforce material introduced in lecture.

REQUISITES:
Previous Course Requirements
MAT 090 - Fundamentals of Algebra, or MAT 011 - Beginning Algebra, or MAT 011B - Beginning Algebra with Review of Arithmetic with a minimum grade of C within 5 years, or High School Algebra II with a minimum grade of B within 5 years.

Concurrent Course Requirements
None

LEARNING OUTCOMES
Upon successful
completion of this course,
the student will be able to:

LEARNING OUTCOMES	LEARNING ACTIVITIES	EVALUATION METHODS
8. Identify reasonable sources of experimental error.	Lecture Small Group Discussions Laboratory Experiments Demonstrations Videos Daily Reading and Problem-Solving Assignments	Homework/Quiz Laboratory Report Section Examinations Final Exam
9. Communicate experimental results through appropriately written lab reports.	Lecture Small Group Discussions Laboratory Experiments Demonstrations Videos Daily Reading and Problem-Solving Assignments	Homework/Quiz Laboratory Report Section Examinations Final Exam
10. Interpret the graphical representation of various physical quantities.	Lecture Small Group Discussions Laboratory Experiments Demonstrations Videos Daily Reading and Problem-Solving Assignments	Homework/Quiz Laboratory Report Section Examinations Final Exam

At the conclusion of each semester/session, assessment of the learning outcomes will be completed by course faculty using the listed evaluation method(s). Aggregated results will be submitted to the Associate Vice President of Academic Affairs. The benchmark for each learning outcome is that *70% of students will meet or exceed outcome criteria*.

SEQUENCE OF TOPICS:
1. Kinematics
2. Vectors
3. Force and Friction
4. Work and Energy
5. Conservation of Energy
6. Linear momentum
7. Rotational Motion
8.
9. Circular Motion
10. Static Equilibrium
11. Fluid Mechanics
12. Thermodynamics
13. Waves and Sound

14. Electric Charge and Electric Fields
15. Electric Potential
16. Capacitance
17. Current and Resistance
18. DC Circuits
19. Magnetism and Magnetic Fields
20. Faraday's Law of Electromagnetic Induction
21. AC Circuits
22. Electromagnetic Waves and the Nature of Light
23. Mirrors and Lenses
24. Interference and Diffraction of Light

SEQUENCE OF EXPERIMENTS:
1. Acceleration Due to Gravity
2. Vector Addition
3. Newton's 2nd Law
4. Friction
5. Work-Energy Theorem
6. 1-Dimensional Collisions
7. Centripetal Force
8. Statics
9. Thermal Expansion
10. Standing Waves and Resonance
11. Mapping Electric Fields
12. The Oscilloscope
13. Basic DC Circuits
14. Electromagnetic Induction
15. Optics   Mirrors and Lenses

LEARNING MATERIALS:
Textbook: Giancoli. (2013) *Physics: Principles with Applications* (7th ed.) Pearson.
PHY115 Laboratory Manual
Scientific calculator (logarithms, exponential, powers, roots, etc.)

Learning Resources:
Physics Computer Lab (Science Center 216)
Tutorial Services (College Hall)

Other learning materials may be required and made available directly to the student

COURSE APPROVA792 A612 792 reW*nBW*nQ0 g1nBT/F1 12 Tf1 0 0 1 72.024 681.1 Tm0 g0 G[CC