

MIDDLESEX COUNTY COLLEGE
EDISON, NEW JERSEY
DEPARTMENT OF NATURAL SCIENCES

Course ID and Name: PHY 101 PRINCIPLES OF PHYSICS

Department: Department of Natural Sciences

Chairperson: Dr Donna Howell
Office Location: SH 104
E-mail Address: DHowell@middlesexcc.edu
Telephone: 732-906-2592

Prerequisite: MAT 107 - Mathematics I or Equivalent

Corequisite: None

Catalog Course Description:

Includes an introduction to Newtonian mechanics with application of the conservation laws to physical systems. Electromagnetism and geometrical optics are introduced at an elementary level. Topics in wave propagation, thermodynamics, atomic and nuclear physics are covered.

General Education Status: Science

Class Hours: 3 **Laboratory Hours:** 2 **Credit Hours:** 4

Learning Outcomes:

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

1. Utilize the scientific method
2. Apply Newton's laws to the analysis of motion
3. Utilize the concepts of work and energy to analyze physical systems
4. Perform simple DC and Ac circuit calculations
5. Apply simple quantum mechanics to spectra and atomic structure

Course Requirements:

Students must attend every lecture and lab.

Assessment tool
Class Tests
Quizzes
Homework Assignments
Final Exam

GRADING STANDARD:

Upon completion of the course, grades will be assigned as follows:

- A= 90 – 100%**
- B+ = 86 - 89%**
- B= 80 - 85%**
- C+ = 76 - 79%**
- C= 70 - 75%**
- D= 60 - 69%**
- F = <60%**

Course Content Areas:

1. Standards of Measurement
2. Vectors
3. Kinematics
4. Newton's Laws of Motion
5. Momentum
6. Torque and forces in two dimensions
7. Conservation of energy
8. Rotational Motion
9. Newton's law of Gravitation
10. Properties of Matter
11. Temperature and heat transfer
12. Wave motion and sound
13. Basic electricity
14. Magnetism
15. AC circuits
16. Geometrical Optics

Textbook for Course:

<u>Author</u>	<u>Title</u>	<u>Publisher</u>	<u>Copyright</u>
D. Ewen, N. Schurter, and E. Gundersen	Applied Physics, 11 th Ed.	Pearson	2017

Supplementary Material: Linear Graph Paper
Calculator with Scientific Notation Functions

Course Outline

1. **Mathematics Review**
Scientific Notation, Calculating Skills, Algebra, etc.
2. **Mechanics and Energy**
3. **Thermodynamics**
Temperature, Heat, and the Laws of Thermodynamics
4. **Mechanical Waves and Sounds**

5. **Static and current Electricity**
Simple Charging Effects
Ohm's Law and Power in a Single-Resistance Circuit
6. **Practical Electricity**
Series and parallel Circuits, Wiring, and Safety
7. **Electromagnetism and Alternating Currents**
Laws of Magnetism, Motors, Generators, Transformers, Electromagnetic Waves
8. **Geometrical Optics**
Lenses, Mirrors, Microscopes, Telescopes
9. **Physical Optics and Quantum Theory**
Prism and Diffraction Spectrometers, the Photon Theory of Light
10. **Atomic and Nuclear Physics**

Laboratory Experiments

1. Graphing Skills (Preparation of Graphs)
2. Measurements (Significant Figures in Calculating, Averaging, Simple Error Analysis)
3. Analysis of the Motion of a Falling Object
4. Calorimetry
5. Resonance in Air Columns
6. Electronics
7. Direct Current Circuits - Ohm's Law (A Study of the Electrical Properties of Various Circuit Elements)
8. Data Analysis with a Computer (Calculating the Average and Standard Deviation and Finding the Line of Best Fit for Linear, Exponential, and Power Relationships)
9. The Oscilloscope
10. Ray Tracing (A Study of Reflection and Refraction of Light)
11. Lenses
12. The Diffraction Spectroscope (Analyzing the Light from Various Gas Discharge Tubes)
13. Radioactivity (A Study of the Absorption of Gamma Rays and Graphical Analysis of Data Using the Computer)