COURSE SYLLABUS
KAP PHYSICS
Northland HS 2008-09

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Text: Serway and Faughn, College Physics, Seventh Edition

This course is offered in collaboration with Kenyon College and is equivalent to a semester of college physics (mechanics) with calculus. At Northland it is the second year physics course.

All documents for this course are available through Blackboard.

I. Newtonian Mechanics

A. Kinematics (including vectors, vector algebra, components of vectors, coordinate systems, displacement, velocity, and acceleration)
- 1 . Motion in one dimension
- 2. Motion in two dimensions, including projectile motion

B. Newton's laws of motion (friction and centripetal force)
- 1 . Static equilibrium (first law)
- 2. Dynamics of a single particle (second law)
- 3. Systems of two or more bodies (third law)

C. Work, energy, power
- 1. Work and work-energy theorem
- 2. Conservative forces and potential energy
- 3. Conservation of energy
- 4. Power

D. Systems of particles, linear momentum
- 1 . Center of mass
- 2. Impulse and momentum
- 3. Conservation of linear momentum,collisions

E. Circular motion and rotation
- 1 . Uniform circular motion
- 2. Angular momentum and its conservation
  - a. Extended bodies, including rotational inertia
- 3. Torque and rotational statics
- 4. Rotational kinematics and dynamics

F. Oscillations and gravitation
- 1. Simple harmonic motion (dynamics and energy relationships)
- 2. Mass on a spring
- 3. Pendulum and other oscillations
- 4. Newton's law of gravity
- 5. Orbits of planets and satellites

II. Electricity and Magnetism

A. Electrostatics

1. Charge, field, and potential

2. Coulomb's law and field and potential of point charges

3. Fields and potentials of other charge distributions

4. Gauss's law

B. Conductors, capacitors, dielectrics

1. Electrostatics with conductors

2. Capacitors

a. Parallel plate

b. Spherical and cylindrical

3. Dielectrics

C. Electric circuits

1.Current, resistance, power

2. Steady-state direct current circuits