Physics 221 Master Syllabus
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CITY COLLEGES OF CHICAGO

PHYSICS 221

Course Title:
MECHANICS, WAVES, AND HEAT

Length of course: 16 Weeks
Contact Hours: 8 Contact Hours
Credit Hours: 5 Credit Hours
Lecture Hours: 4 Lecture Hours
Lab Hours: 4 Lab Hours
Weekly Plan: 8 Hours

Catalog Description:
Foundations and concepts in physics, including elementary problems in mechanics wave motion and heat. *Writing assignments, as appropriate to the discipline, are part of the course.*

This Course is Expected to Serve Students in:
Liberal Arts, Health, Architecture and other Technical programs.

Pre-requisites:
Grade of 'C' or better in Math 141 or higher with or concurrent enrollment in Math 141 or Math 143, and Eligibility for English 101 or consent of department chairperson.

Course Objectives:

1. Understand Newton's Laws of Motion and apply these laws to solve problems involving translation, circular motion, and momentum.
2. Demonstrate the ability to reformulate problems using the concept of energy and its conservation.
3. Understand the properties of fluids.
4. Understand oscillatory motion and wave mechanics.
5. Understand heat, heat engines and the Laws of Thermodynamics

Student Learning Outcomes:

Upon satisfactory completion of the course, students will be able to:

1. Convert between units of measurement.
2. Solve problems involving displacement, velocity, acceleration and time.
3. Solve free fall problems.
4. Resolve vectors into components.
5. Add vectors graphically and analytically.
6. Solve trajectory problems.
7. Solve problems involving Newton's laws of motion.
8. Calculate static and kinetic friction forces.
9. Solve circular motion problems using centripetal force and acceleration.
10. Calculate gravitational orbits.
11. Calculate work done by a force.
12. Calculate kinetic and potential energy.
13. Solve problems involving conservation of energy.
14. Calculate the power developed by a force.
15. Calculate the linear momentum of a body.
16. Solve interaction problems using conservation of linear momentum.
17. Solve rotation problems using the concepts of radians, angular velocity, angular acceleration, torque, moment of inertia, and angular momentum.
18. Calculate the forces acting on a rigid body.
19. Calculate stress and strain using elastic moduli and ultimate strengths.
20. Calculate densities and pressures.
21. Solve buoyancy problems using Archimedes' principle.
22. Solve fluid flow problems using Bernouli's equation.
23. Calculate the energy, period, frequency, and amplitude of a harmonic oscillator.
24. Calculate the frequency, period, speed and wavelength of traveling and standing waves.
25. Calculate the intensity level of sound waves in decibels.
26. Calculate entropy changes in thermodynamic processes .
27. Solve problems involving temperature conversions, thermal expansion and stress.
28. Solve gas problems using the ideal gas law and Avogadro's number.
29. Calculate heat flow between bodies of different temperature using the concepts of specific heat capacity, conduction, convection, and radiation.
30. Solve calorimetry problems.
31. Analyze heat engines and refrigerators using the first and second law of themodynamics.
32. Calculate entropy changes.

Topical Outline:

1. Units of measurement
    a. Metric units
    b. Unit conversions
    c. Significant figures
2. Kinematics
    a. Displacement
    b. Velocity
    c. Acceleration
    d. Motion with constant acceleration
    e. Free fall
3. Vectors
    a. Magnitude and direction
    b. Components
    c. Resultant vector.
    d. Vector addition and subtraction
    e. Projectile motion.
4. Newton's Laws of Motion
    a. Newton's first law: Inertia
    b. Newton's second law: Force and acceleration
    c. Newton's third law: Action and reaction
    d. Weight
    e. Free body diagrams
    f. Friction
    g. Inclined planes
5. Circular Motion
    a. Centripetal acceleration and force
    b. Newton's law of gravity
    c. Gravitational orbits: planets and satellites
    d. Kepler's laws
6. Work, Energy and Power
    a. Work
    b. Kinetic energy
    c. Potential energy
    d. Work energy theorem
    e. Conservation of energy
    f. Power
7. Linear momentum
    a. Impulse of a force
    b. Momentum
    c. Conservation of linear momentum

d. Collisions: elastic and inelastic
e. Center of mass

8. Rotational Motion
   a. Angular measure: radians
   b. Angular velocity
   c. Angular acceleration
   d. Torque
   e. Moment of inertia
   f. Rotational dynamics
   g. Rotational kinetic energy
   h. Angular momentum
9. Bodies in Equilibrium
   a. Equilibrium of force
   b. Equilibrium of torques
   c. Solving statics problems
10. Elasticity
   a. Stress and strain
   b. Elastic moduli
   c. Ultimate strengths
11. Fluids
   a. Density
   b. Specific gravity
   c. Phases of matter
   d. Pressure
   e. Liquid pressure
   f. Atmospheric pressure
   g. Absolute and gauge pressure
   h. Barometers and manometers
   i. Pascal's principle
   j. Buoyancy
   k. Archimedes' principle
   l. Fluid flow
   m. Bernoulli's equation
   n. Continuity equation
12. Oscillatory Motion
   a. Simple harmonic motion
   b. Amplitude, period, and frequency
   c. Energy
13. Waves
   a. Speed, frequency, and wavelength
   b. Amplitude
   c. Energy, intensity
   d. Longitudinal and transverse waves
   e. Standing waves: harmonics
14. Sound

a. Speed
b. Audible frequencies
c. Intensity, loudness
d. Sound level, decibels
e. Doppler effect

15. Temperature
    a. Temperature scales: Fahrenheit, Celsius, and Kelvin
    b. Conversions
    c. Thermal expansion
    d. Ideal gas law
    e. Kinetic theory and the molecular interpretation of temperature
    f. Distributions of molecular speeds and energy
    g. Relative humidity and vapor pressure
16. Heat
    a. Internal energy
    b. Specific heat capacity
    c. Calorimetry
    d. Change of phase: latent heat
    e. Heat transfer: conduction, convection, radiation
17. The Laws of Thermodynamics
    a. The first law of thermodynamics
    b. Heat, internal energy, and work
    c. Special processes: isothermal, isobaric, adiabatic, isochoric
    d. p – V diagrams
    e. The second law of thermodynamics
    f. Thermodynamic cycles
    g. Efficiency of heat engines
    h. Gasoline engines
    i. Steam engines
    j. Refrigerators
    k. Heat pumps
    l. Entropy

Recommended Laboratory Exercises to Illustrate:

1. Basic measurements of mass, length and density
2. Acceleration of freely falling bodies.
3. Newton's second law.
4. Centripetal force
5. Work and energy.
6. Conservation of linear momentum.
7. Trajectories.
8. Rotational inertia.
9. Spring oscillators
10. Simple pendulums
11. Standing waves.

12. Buoyancy and Archimedes Principle
13. Thermal expansion
14. Specific heat and calorimetry

Methods of Evaluation:
20.00% Quizzes
5.00% Homework
50.00% Objective tests
5.00% Studio/Lab performance
20.00% Summative final examination
Total Percentage: 100%

Methods of Instruction:
Discussion / Lecture
Lab / Lab Discussion
Group work

Sample Text:
Giancoli Physics 6th Edition, Pearson - Prentice Hall, 2004 ISBN: 0-13-035256-x

HAROLD WASHINGTON COLLEGE
One of the City Colleges of Chicago

COURSE SYLLABUS

Course Title and Section: PHYSICS, 221, MECHANICS, WAVES, AND HEAT
Length of course: 16 Weeks
Contact Hours: 8 Contact Hours
Credit Hours: 6 Credit Hours
Lecture Hours: 4 Lecture Hours
Lab Hours: 4 Lab Hours
Weekly Plan: 8 Hours

Catalog Description:
Foundations and concepts in Physics, including elementary problems in mechanics and heat. Writing assignments, as appropriate to the discipline, are part of the course.

Students the Course is Expected to Serve:
Students in liberal arts, health, architecture and technical curricula.

Pre-requisites:
Prerequisite -- MATH 143 With a minimum grade of 'C' or concurrent enrollment in Math 143(college algebra) or completion of Math 141

Course Objectives:
1. Understand Newton's Laws of Motion and apply these laws to solve problems involving translation, circular motion, and momentum.
2. Demonstrate the ability to reformulate problems using the concept of energy and its conservation.
3. Understand the properties of fluids.
4. Understand oscillatory motion and wave mechanics.
5. Understand heat, heat engines and the Laws of Thermodynamics

Student Learning Outcomes:
Upon satisfactory completion of the course, students will be able to:
1. Convert between units of measurement.
2. Solve problems involving displacement, velocity, acceleration and time.
3. Solve free fall problems.
4. Resolve vectors into components.
5. Add vectors graphically and analytically.
6. Solve trajectory problems.
7. Solve problems involving Newton's laws of motion.
8. Calculate static and kinetic friction forces.
9. Solve circular motion problems using centripetal force and acceleration.

10. Calculate gravitational orbits.
11. Calculate work done by a force.
12. Calculate kinetic and potential energy.
13. Solve problems involving conservation of energy.
14. Calculate the power developed by a force.
15. Calculate the linear momentum of a body.
16. Solve interaction problems using conservation of linear momentum.
17. Solve rotation problems using the concepts of radians, angular velocity, angular acceleration, torque, moment of inertia, and angular momentum.
18. Calculate the forces acting on a rigid body.
19. Calculate stress and strain using elastic moduli and ultimate strengths.
20. Calculate densities and pressures.
21. Solve buoyancy problems using Archimedes' principle.
22. Solve fluid flow problems using Bernoulli's equation.
23. Calculate the energy, period, frequency, and amplitude of a harmonic oscillator.
24. Calculate the frequency, period, speed and wavelength of traveling and standing waves.
25. Calculate the intensity level of sound waves in decibels.
26. Calculate entropy changes in thermodynamic processes.
27. Solve problems involving temperature conversions, thermal expansion and stress.
28. Solve gas problems using the ideal gas law and Avogadro's number.
29. Calculate heat flow between bodies of different temperature using the concepts of specific heat capacity, conduction, convection, and radiation.
30. Solve calorimetry problems.
31. Analyze heat engines and refrigerators using the first and second law of thermodynamics.
32. Calculate entropy changes.

Methods of Instruction:
Discussion/Lecture
Lab / Lab Discussion
Group work

Definition / Statement of Active Pursuit of the Course:
At the mid-point of the semester, a Midterm Grade of F or an ADW (Administrative Withdrawal) will be entered for students who are not actively pursuing the course. Active Pursuit means student is attending class regularly and turning in acceptable (passing) work regularly. Thus, a student will be withdrawn from the class at midterm if EITHER of the following are true: (1) the student has missed a total of six or more class periods by the mid-point in the semester, OR (2) the student has received fewer than 50% of the points assigned by the mid-point in the semester. If either (1) or (2) is true, it is the student's responsibility to meet with the instructor outside of class to discuss the possibility of remaining enrolled in the course. District and College attendance policies are listed in the college catalog and the Student Policy Manual: http://ccc.edu/Student/files/Student_Policy_Manual_8.25.09.pdf

"No Show" Policy:

If a student registered for the course before the start time of the first class period, but 1) did not attend the first 2 classes, or 2) attended only 1 of the first 3 classes and failed to notify the instructor of his or her intentions to continue the class, the Registrar's Office will remove the student from the course.

Academic integrity

The City Colleges of Chicago is committed to the ideals of truth and honesty. In view of this, students are expected to adhere to high standards of honesty in their academic endeavor. Plagiarism and cheating of any kind are serious violations of these standards and will result, minimally, in the grade of "F' by the instructor.

Student Conduct

City Colleges of Chicago students are expected to conduct themselves in a manner which is considerate of the rights of others and which will not impair the educational mission of the College. Misconduct for which students are subject to College Discipline (e.g. expulsion) may include the following: (1) all forms of dishonesty such as stealing, forgery, (2) obstruction or disruption of teaching, research, administration, disciplinary proceeding, (3) physical or verbal abuse, threats, intimidation, harassment, and/or other conduct that threatens or endangers the health or safety of any person, and (4) carrying or possession of weapons, ammunition or other explosives.

Disability Access Center:

Please note: Any student with a disability, including a temporary disability, who is eligible for reasonable accommodations should contact the Disability Access Center.

Classroom Etiquette

Students may not use cell phones, talk during lectures or in any way disturb the class.

Grading:

Quizzes and Homework: 300 points In-Class Activities :350 points Laboratory: 350 points Tests: 600 points Mid-Term and Final Exams: 400 points Total possible points: 2000 points	Grade Distribution 1800-2000 points = letter grade A 1600-1799 points= letter grade B 1400-1599 points = letter grade C 1200-1399 points = letter grade D Less than 1200 points =letter grade F

If by the end of the course, "Total possible points" is lower or higher than 2000 points, a weighting factor will be applied to convert to the above grading scale.

Homework policy:

All assignments including homework, quizzes, lab reports, in-class activities, are due promptly

on the due date. Late work will not be accepted. If a test must be missed because of EMERGENCY reasons, notify the instructor in advance or by the day of the test. Be prepared to document your reason for absence. Due to equipment and room availability problems, labs cannot be made up.

In-Class Work:
Grades are not based on attendance per se, but a certain amount of graded work will be assigned and collected in class. This work will predominantly be group work, and can only be completed on the day it is assigned. Every student has to be present and participate for the complete instructional time of each session throughout the semester.

Lectures:
During class time emphasis is placed on the student being actively engaged doing physics and not passively listening to the instructor's presentations. There will not be exhaustive formal lecturing on each chapter. Students are expected to read the textbook material in advance, participate actively in class performing experiments, discussing demonstrations, solving quantitative and qualitative exercises, presenting results in written and verbal forms, reading and practicing outside the classroom, submitting assignments on time, preparing for and taking tests. Short lectures will be presented on selected topics

Laboratory policy:
Laboratory activities are strongly related with other class activities like in-class activities. Some laboratory work will involve using computers to analyze and display data as well as analyzing videos or computer simulations. Due to equipment and room availability limitations, labs cannot be made up.

Calendar (Weekly Course Outline):

Week	Topics	Labs/lab description
1	Measurement, Units, Uncertainty and Significant Figures	Basic Measurements (measurement of length, reaction time, etc. and including/calculating uncertainty in measurements)
2	Displacement, Average Velocity, and Speed; Instantaneous Velocity; Acceleration; Particles Experiencing Constant Acceleration; Freely Falling Bodies	One dimensional motion (Analysis of one dimensional motion, position, velocity and acceleration diagrams using motion sensors)
3	Coordinate Systems; Position, Velocity, and Acceleration Vectors; Vector Algebra; Projectile Motion; Relative Motion; Uniform and Nonuniform Circular Motion	Projectile Motion (Analysis of acceleration in two dimensions for object involving projectile motion)

4	Force and Interactions; Newton's Laws of Motion; Free-Body Diagrams; Newton's First and Second Law; Application's of Newton's Laws; Frictional Forces	Force table (addition of forces and determining magnitude/direction of unknown force for object in equilibrium). Measuring the coefficient of friction (measuring static/kinetic friction between various surfaces)
5	Work and Kinetic Energy; Work Done by a Variable Force; Potential Energy of a System; Conservative and Non-Conservative Forces; Conservative Forces and Potential Energy	Work and Energy (work done by a constant lifting force and by a non-constant spring force) Kinetic Energy and the work energy principle (students check the work-energy theorem by doing work on a cart with a spring)
6	Conservation of Energy; Non-Isolated and Isolated Systems; Situations involving Non-Conservative Forces and Kinetic Friction; Energy Diagrams; Power	Conservation of elastic and gravitational potential energy (analysis of transformation of energy of mass-spring system)
7	Impulse and Momentum; Conservation of Momentum; Elastic and Inelastic Collisions; Explosions; Collisions in One and Two Dimensions; Center of Mass	Collisions on an air track; two dimensional collisions (analysis of momentum before and after 1-dimensional collisions of dynamics carts/2-dimensional collisions of pucks on air table)
8	Rigid-Body Angular Acceleration; Rotational Kinetic Energy; Calculations of Moments of Inertia; Torque; Rotational Dynamics of Rigid and Rolling Bodies	Moment of inertia; rotational dynamics (measuring moment of inertia of ring/disk and comparison to calculations; measuring angular acceleration of rotating bodies)
9	Angular Momentum; Isolated Systems and the Conservation of Angular Momentum; Static Equilibrium; Elastic Properties of Solids; Stress and Strain	Balancing; Equilibrium of rigid bodies (determining equilibrium conditions of rotating rigid bodies)
10	Fluids; Pressure; Buoyancy and Pascal's Principle; Fluid Dynamics; Continuity and Bernoulli's Principle; Other Applications of Fluid Dynamics	Buoyancy (measuring buoyant force on submerged masses; determining specific gravity of submerged/floating objects)
11	Simple Harmonic Motion; Simple Harmonic Motion and Circular Motion; Energy in Simple Harmonic Motion; Simple and Physical Pendulums; Damped Oscillations; Forced Oscillations and Resonance	Mechanical energy conservation in simple harmonic motion (determining relationship between period of oscillation of pendulum/mass on spring and experimental parameters)

12	Wave Motion; Propagation of a Disturbance; Traveling Wave Model; Waves on a String; Reflection and Transmission; Rate of energy Transfer in Waves; Linear Wave Equation	Wave pulses on a string (analysis of longitudinal/transverse wave pulses on springs)
13	Sound and Light Waves; Speed of sound waves; Periodic sound Waves; Power, Intensity, and Decibels; The Doppler Effect	Sound waves (analysis of shape, amplitude, period, frequency, wavelength, intensity of a sound wave, sound interference, beats)
14	The Principle of Superposition; Standing Waves on a String; Standing Sound Waves; Interference in One, Two and Three Dimensions; Resonance; Beats	Standing waves on a string; resonance tube (determining relationship between tension/wavelength for standing waves on string; determining speed of sound from wavelengths of standing sound waves in closed-open tube)
15	Temperature and Heat	Temperature measurements using glass and digital thermometer. Specific Heat of metals by calorimetry (verifying that the specific heat of different materials is different).
16	Thermodynamics	The mass lifter heat engine (studying the relationship between work done by a heat engine and changes in the pressure and volume of the engine's working medium)

CITY COLLEGES OF CHICAGO

PHYSICS 222

Course Title:
ELECTRICITY, LIGHT, and MODERN PHYSICS

Length of course: 16 Weeks
Contact Hours: 8 Contact Hours
Credit Hours: 5 Credit Hours
Lecture Hours: 4 Lecture Hours
Lab Hours: 4 Lab Hours
Weekly Plan: 8 Hours

Catalogue Description:
Continuation of Physics 221. Exploration of Electromagnetism, Light and Modern Physics using an algebra based approach. Writing assignments, as appropriate to the discipline, are part of the course.

Students the Course is Expected to Serve:
Students in Liberal Arts, Health, Architecture and other Technical programs.

Pre-requisites:
Grade of 'C' or better in Physics 221 and Math 141 and eligibility for English 101 or consent of department chairperson.

Course Objectives:

1. Understand the principles of electric fields, potential, resistance, and capacitance.
2. Evaluate DC series and parallel circuits.
3. Demonstrate an understanding of magnetic fields, particle dynamics, and induction.
4. Evaluate AC circuits.
5. Understand the properties of light with regards to curved mirrors and lenses.
6. Explain refraction interference, diffraction,
7. Understand the concepts of special relativity.
8. Interpret the concepts of quantum theory.
9. Understand radioactive decay, fission, fusion.
10. Understand basic particle physics.

Student Learning Outcomes:

Upon satisfactory completion of the course, students will be able to:

1. Calculate the electric force between pairs of charges.
2. Calculate the force on a charge in an electric field.
3. Calculate the electric field of a charge or a group of charges.
4. Determine the energy of a change of a charge moving through a potential difference.
5. Calculate the potential due to point charge or a group of charges.
6. Solve problems involving capacitance with/without dielectrics.
7. Calculate current, voltage and resistance using Ohm's law.
8. Determine the power in an electric circuit.
9. Solve series, parallel circuit problems using Kirchoff's Laws involving DC circuits.
10. Calculate time constants of RC circuits.
11. Calculate the magnetic force on moving charges and currents.
12. Calculate the torque in problems involving wires coils and motors.
13. Calculate the speed, radius and frequency of circular orbits of charges in a magnetic field.
11. Solve electromagnetic induction problems using Faraday's law.
12. Calculate primary and secondary voltages and currents in transformers.
13. Identify different portions of the electromagnetic spectrum.
14. Solve optics problems involving refraction and reflection.
15. Draw ray diagrams for lenses and mirrors.
16. Calculate the focal length, image position for lens and mirror systems.
17. Solve problems involving the interference and diffraction of light.
18. Calculate relativistic time dilation, length contraction, momentum, and energy.
19. Solve photoelectric effect problems.
20. Calculate the energy levels and spectrum of hydrogen using Bohr's model.
21. Calculate uncertainties using Heisenberg's principle.
22. Calculate the energy released in nuclear processes such as radioactivity, fission, and fusion.
23. Calculate radiation rate and dosage.
24. Identify the fundamental particles of matter and energy.

Topical Outline:

1. Electric charge
   a. Protons, electrons, neutrons, atoms, ions
   b. Electric force: Coulomb's law
   c. Electric field
   d. Electric field lines
   e. Electric field of point charges and simple sources
   f. Insulators and conductors
   g. Gauss's law

2. Electric potential
    a. Electric potential energy
    b. Electric potential
    c. Equipotential surfaces
    d. Electron volt
    e. Potential due to point charges and simple sources
    f. Dipoles
    g. Capacitance
    h. Dielectric constant
3. Electric current
    a. Voltage sources
    b. Current
    c. Resistance and resistivity
    d. Electric circuits
    e. Ohm's law
    f. Electric power
    g. Alternating current: RMS
4. DC Circuits
    a. EMF and terminal voltage of a source
    b. Series and parallel circuits
    c. Combination circuits
    d. Kirchhoff's Laws
    e. Capacitor circuits
    f. RC circuits: time constants
5. Magnetism
    a. Magnetic field
    b. Magnetic force on moving charge and current
    c. Circular magnetic orbits
    d. Sources of magnetic field: long wires and current loops
    e. Ampere's law
    f. Torque on a current loop: motors
    g. Mass spectrometers
    h. Ferromagnetism
6. Electromagnetic induction
    a. Magnetic flux
    b. Induced EMF
    c. Faraday's law
    d. Lenz's law
    e. Generators
    f. Transformers
    g. Inductance
7. AC circuits
    a. Reactance
    b. Impedance
    c. Phase

d. Photoelectric effect
e. DeBroglie's hypothesis: matter as waves
f. Bohr's theory
g. Quantized electron orbits in atoms
h. Energy levels
i. Heisenberg's uncertainty principle
j. Quantum numbers
k. Pauli exclusion principle
l. Semiconductors: diodes and transistors

14. Nuclear physics
    a. Nuclear structure
    b. Binding energy
    c. Radioactivity
    d. Half-life
    e. Decay series
    f. Radioactive dating
    g. Fission
    h. Fusion
    i. Measurement of source activity
    j. Measurement of absorbed dose
15. Particle physics
    a. Accelerators
    b. Antimatter
    c. Force as particle exchange
    d. Quarks
    e. Leptons
    f. Bosons
    g. The Standard Model

Recommended Laboratory Exercises to Illustrate:

1. Electric fields
2. DC circuits
3. Resistivity
4. Temperature dependence of resistance
5. Electronic instrumentation
6. Electronic devices
7. RC circuits: time constant
8. AC circuits: impedance, resonance
9. Solid state electronics: diodes and rectifiers
10. Transistor circuits
11. Index of refraction
12. Geometric optics: lenses and mirrors
13. Physical optics; diffraction gratings, spectroscopy
14. Radioactivity

Methods of Evaluation:
20.00% Quizzes
20.00% Homework
5.00% Class Projects
50.00% Comprehensive midterm\final exams
5.00% Summative final examination
Total Percentage: 100%

Methods of Instruction:
Discussion/Lecture
Lab/Lab Discussion
Group work

Sample Text:

Giancoli Physics 6th Edition, Pearson - Prentice Hall, 2004 ISBN: 0-13-035256-x

WRIGHT COLLEGE
One of the City Colleges of Chicago

COURSE SYLLABUS
Fall 2011

Course Title and Section: PHYSICS 222 HJ
Length of Course: 16 Weeks
Credit Hours: 5 Contact hours
Contact Hours: 8 Credit hours
Class Meeting Times: TBA
Building / Room: Room S335

Instructor: Warren Wolfe
E-Mail: wwolfe@ccc.edu
Phone: 773- 481 8391
Office: L387

Office hours: Monday & Wednesday: 7:50 – 9:20 a.m. & 12:30 – 1:00 p.m.
Tuesday & Thursday: 7:50 – 9:20 a.m.

Course Website :
faculty.ccc.edu/colleges/wright/science/physics221/physics222.htm

Course Description:
Continuation of Physics 221. Prerequisite: Completion of Physics 221 and eligibility for Math 143

Pre-requisites:
Completion of Physics 221 and Math 141 or higher with a grade of 'C' or better and eligibility for English 101 or consent of department chairperson.

Students Course is Expected to Serve:
Students in liberal arts, health, architecture or technical curricula

Course Objectives:
This course is designed to provide students with a basic understanding of electromagnetism, optics, relativity, quantum theory, nuclear physics, and particle physics. Students will build a solid base in these topics by learning the fundamental concepts and by developing the necessary problem solving skills. This will be accomplished by means of classroom lectures, laboratory experiments, and problem assignments.

Student Learning Outcomes:
Upon satisfactory completion of the course, students will be able to:

1. Calculate the electric force between pairs of charges.
2. Calculate the force on a charge in an electric field.
3. Calculate the electric field of a charge or a group of charges.
4. Determine the energy of a change of a charge moving through a potential difference.
5. Calculate the potential due to point charge or a group of charges.

6. Solve problems involving capacitance with/without dielectrics.
7. Calculate current, voltage and resistance using Ohm's law.
8. Determine the power in an electric circuit.
9. Solve series, parallel circuit problems using Kirchoff's Laws involving DC circuits.
10. Calculate time constants of RC circuits.
1. Calculate the magnetic force on moving charges and currents.
2. Calculate the torque in problems involving wires coils and motors.
3. Calculate the speed, radius and frequency of circular orbits of charges in a magnetic field.
11. Solve electromagnetic induction problems using Faraday's law.
12. Calculate primary and secondary voltages and currents in transformers.
13. Identify different portions of the electromagnetic spectrum.
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15. Draw ray diagrams for lenses and mirrors.
16. Calculate the focal length, image position for lens and mirror systems.
17. Solve problems involving the interference and diffraction of light.
18. Calculate relativistic time dilation, length contraction, momentum, and energy.
19. Solve photoelectric effect problems.
20. Calculate the energy levels and spectrum of hydrogen using Bohr's model.
21. Calculate uncertainties using Heisenberg's principle.
22. Calculate the energy released in nuclear processes such as radioactivity, fission, and fusion.
23. Calculate radiation rate and dosage.
24. Identify the fundamental particles of matter and energy.

Required Texts and Materials:
Text: Physics by Giancoli, Sixth edition, 2005 ISBN #0-13-060620-0
Materials: Calculator

Method of Instruction: Lecture, Lab, Problem Solving Sessions

Definition / Statement of Active Pursuit of the Course:
District and College attendance policies are listed in the college catalog and the Student Policy Manual:
http://ccc.edu/Student/files/Student_Policy_Manual_8.25.09.pdf

At midterm students will be dropped from the class for lack of active participation for any of the following reasons:
1) Failure to attend 75% of the classes.
2) Failure to submit 75% of the assigned homework.
3) Failure to submit 75% of the lab reports.
4) Failure to take 75% of the quizzes and tests.

Attendance does not affect the grade

"No Show" Policy:
If a student registered for the course before the start time of the first class period, but 1) did not attend the first 2 classes, or 2) attended only 1 of the first 3 classes and failed to notify the instructor of his or her intentions to continue the class, the Registrar's Office will remove the student from the course.

Academic integrity:

The City Colleges of Chicago is committed to the ideals of truth and honesty. In view of this, students are expected to adhere to high standards of honesty in their academic endeavor. Plagiarism and cheating of any kind are serious violations of these standards and will result, minimally, in the grade of "F' by the instructor.

Student Conduct:
City Colleges of Chicago students are expected to conduct themselves in a manner which is considerate of the rights of others and which will not impair the educational mission of the College. Misconduct for which students are subject to College Discipline (e.g. expulsion) may include the following: (1) all forms of dishonesty such as stealing, forgery, (2) obstruction or disruption of teaching, research, administration, disciplinary proceeding, (3) physical or verbal abuse, threats, intimidation, harassment, and/or other conduct that threatens or endangers the health or safety of any person, and (4) carrying or possession of weapons, ammunition or other explosives.

Disability Access Center:
Please note: Any student with a disability, including a temporary disability, who is eligible for reasonable accommodations should contact the Disability Access Center.

Classroom Etiquette:
Students may not use cell phones, talk during lectures or in any way disturb the class.

Grading: Quizzes and Tests: 80% - 90%
Lab and homework: 10% - 20%

Grade Distribution
92% to 100% = A
82% to 91% = B
65% to 81% = C
50% to 64% = D
Below 50% = F

Late Work and Make-up Assignments:
MISSED QUIZZES AND TESTS: *Missed quizzes may not be made up*, so it is your responsibility to take at least ten quizzes. If a test must be missed because of EMERGENCY reasons, notify me BY THE DAY OF THE TEST (773-481-8391). Be prepared to document your reason for absence. Under these conditions a makeup test will be given but the makeup may be more difficult than the test given to the class. Due to equipment and room availability problems, *labs cannot be made up.*

Support Services:
Wright College is committed to your success! Below you will find a list of offices you may wish to contact during the semester for assistance:

Academic Support Center (Tutoring)	Room A-245
Center for Academic Success (Advising)	Room A-120
Writing Center (for help with papers)	Room L-212
Wright in Your Corner (Student Center)	Room S-100
Financial Aid	Room A-128
Business Services	Room A-138

Class Meeting Dates/Weeks	Schedule
Week 1	**Chapter 16: Electric Force, Electric Field**
Week 2	**Quiz: Chapter 16** **Chapter 17: Electric Potential** **Lab: Field Mapping**
Week 3	**Quiz: Chapter 17** **Chapter 18: Electric Current** **Problem Session: Chap 16 - 17**
Week 4	**Quiz: Chapter 18** **Chapter 19: DC Circuits** **Lab: Electronic Instrumentation**
Week 5	**Quiz: Chapter 19** **Chapter 20: Magnetism** **Lab: RC Circuits** **Problem Session: Chap 18 -19**
Week 6	**Quiz: Chapter 20** **Problem Session: Review for Test #1** **Unit Test #1** **Chapter 21: Electromagnetic Induction**
Week 7	**Quiz: Chapter 21** **Chapter 22: Electromagnetic Waves** **Lab: AC Circuits** **Chapter 23 Geometric Optics**
Week 8	**Problem Session: Chap 21 – 23** **Quiz: Chapter 22, 23** **Lab: Lenses and Mirrors** **Chapter 24: Wave nature of Light** **Chapter 25: Optical Instruments**
Week	**Quiz: Chapter 24, 25** **Lab: Double Slit Interference** **Problem Session: Chap 24 – 25** **Chapter 26: Relativity**
Week 10	**Quiz: Chapter 26** **Lab: Spectroscope** **Problem Session: Review for Test #2** **Unit Test #2** **Chapter 27: Quantum Theory**
Week 11	**Quiz: Chapter 27** **Chapter 28: Quantum Theory of Atoms** **Chapter 29: Molecular and Solid State Physics**
Week 12	**Quiz: Chapter 28 - 29** **Lab: Rectifier Circuits** **Chapter 30: Nuclear Physics**
Week 13	**Chapter 30: Nuclear Physics (continued)** **Lab: Radioactivity**
Week 14	**Quiz: Chapter 30** **Chapter 31: Nuclear Energy**
Week 15	**Problem Session: Chap 27 – 31** **Quiz: Chapter 31** **Chapter 32: Particle Physics**
Week 16	**Problem Session: Review for Final Exam**

CITY COLLEGES OF CHICAGO

PHYSICS 235

Course Title:
ENGINEERING PHYSICS 1 – Mechanics and Wave Motion

Length of course: 16 Weeks
Contact Hours: 8 Contact Hours
Credit Hours: 5 Credit Hours
Lecture Hours: 4 Lecture Hours
Lab Hours: 4 Lab Hours
Weekly Plan: 8 Hours

Catalogue Description:
Engineering Physics I Mechanics and Wave Motion – Exploration of the laws of mechanics and wave motion using calculus to analyze practical and theoretical problems. Writing assignments, as appropriate to the discipline, are part of the course.

Students the Course is Expected to Serve:
This course is intended for students majoring in Engineering and those continuing in science programs at four-year institutions.

Pre-requisites:
Credit or Concurrent Enrollment in MATH 207 and Eligibility for English 101 or consent of department Chairperson.

Course Objectives:

1. Recognize the role of vectors and how they are used to analyze the dynamics of single particles.
2. Understand Newton's Laws of motion and and apply these laws to problems involving translation, circular motion,and momentum.
3. Demonstrate the ability to formulate problems using the concept of energy and its conservation.
4. Understand two particle collisions in one and two dimensions and apply the appropriate conservation laws.
5. Evaluate rotational systems applying the concepts of moment of inertia, torque and angular momentum.
6. Understand small oscillations and analyze vibrating systems.
7. Analyze the properties of fluids.
8. Understand the mechanics of wave motion.

Student Learning Outcomes:

1. Upon satisfactory completion of the course, students will be able to:
2. Express quantities in British and metric units.
3. Solve for displacement, velocity, and acceleration in mechanics problems.
4. Solve problems by expressing dymanic properties using vectors notation.
5. Analyze particle trajectories.
6. Solve problems involving circular motion.
7. Analyze problems using relative frames of reference.
8. Solve problems using Newton's Three Laws of Motion.
9. Calculate work, energy (potential/kinetic), and power. Relate these calculations to conservative and non-conservative systems.
10. Analyze collisions of two particles in one and two dimensions. Calculate impulse, and know how to apply principles of momentum conservation.
11. Solve for moment of inertia, angular velocity, angular acceleration, and torque in rotating systems.
12. Analyze systems in static equilibrium.
13. Solve problems involving the elastic properties of solids.
14. Analyze systems involving fluids using Bernoulli's equation.
15. Calculate wave properties in systems involving small oscillations.
16. Perform experiments in mechanics and wave motion and apply techniques of error analysis in analyzing the results.
17. Summarize the results of an experiment in a written report.
18. Apply the principles of mechanics and kinematics to explain events in the real world.

Topical Outline:

1. Physics and Measurement
    - A. Standards of Length, Mass, and Time
    - B. Dimensional Analysis
    - C. Conversion of Units
    - D. Estimates and Order-of –Magnitude Calculations
    - E. Significant Figures
2. Motion in One Dimension
    - A. Position, Average Velocity, and Speed
    - B. Instantaneous Velocity and Speed
    - C. Acceleration
    - D. A Particle Under Constant Acceleration.
    - E. Freely Falling Bodies
    - F. Kinematic Equations Derived froc Calculus General Problem -Solving Strategy
3. Vectors
    - A. Coordinate Systems
    - B. Vectors and Scalars Quantities C Unit Vectors
    - D. Addition of vectors, Geometric method
    - E. Resolution of vectors, Analytic method
    - F. Multiplication of vectors-the dot product

4. Motion in Two Dimensions
    A. Displacement, Velocity, and Acceleration Vectors
    B. Two Dimensional Motion With Constant Acceleration
    C. Projectile Motion
    D. The Particle in Uniform Circular Motion
    E. Tangential and Radial Acceleration
    F. Relative Frames of Reference-Velocity and Acceleration
5. Particle Dynamics
    A. Newton's 1st Law, Inertial Frames
    B. Newton's 2nd Law
    C. Gravitational force and Weight and Mass
    D. Newton's 3rd Law
    E. Applications of Newton's Laws, Free Body Diagrams
    F. Forces of Friction
6. Circular Motion and Other Applications of Newton's Laws
    A. Newton's Second Law for a Particle in Uniform Circular Motion
    B. Non-Uniform Circular Motion
    C. Motion in Accelerated Frames
    D. Motion in the Presence of Resistive Forces, Drag Forces
7. Energy of a System
    A. Work Done by a Constant Force
    B. Work done by a Variable force
    C. The Scalar Product of Two Vectors
    D. Kinetic Energy and Work
    E. Potential Energy of a System
    F. Conservative and Non-Conservative Forces
    G. Conservative Forces and Potential Energy
    H. Potential Energy Diagrams and the Equilibrium of a System
8. Conservation of Energy
    A. Non-Isolated Systems
    B. Isolated Systems: Conservation of Energy
    C. Non-Conservative Forces, Kinetic Friction
    D. Power
10. Linear Momentum and Collisions
    A. Momentum
    B. Impulse and Momentum
    C. Conservation of Momentum
    D. Collisions in One Dimension
    E. Center of Mass, Velocity of the Center of Mass
    F. Kinetic Energy in Collisions and the Coefficient of Restitution
    G. Collisions in Two Dimensions
    H. Rocket Propulsion
11. Rotational of a Rigid Object About a Fixed Axis
    A. Angular Position, Velocity, and Acceleration
    B. Linear and Angular Kinematics quantities for a Part e in Circular Motion
    C. Rotational Kinetic Energy
    D. Calculations of Moments of Inertia
    E. Torque

Recommended Laboratory Exercises to Illustrate:

Basic Measurements
Force Table
Spark Timer - The determination of "g".
Analysis of a trajectory
Newton's Second Law
Centripetal Force
Conservation of Linear Momentum one Dimension
Conservation of Linear Momentum in two Dimensions
Determination of the line of impact in 2-D and the collision viewed from the Center of Mass
Kinetic and Potential Energy
Ballistic Pendulum or Law of Conservation of Energy
Rotational Moment of Inertia
Spring Oscillator
Standing Waves and the Wave Equation
Buoyancy

Methods of Evaluation:
15.00% Quizzes
10.00% Homework
5.00% Group participation
50.00% Objective tests
20.00% Lab performance
Total Percentage: 100%

Methods of Assessment:

At the end of the semester an Exit Assessment is given to all sections of this class to determine the areas where enhancement is need.

Methods of Instruction:

Discussion/Lecture
Lab/Lab Discussion
Groupwork

Recommended Text:

Jewett and Serway Physics for Scientists and Engineers With Modern Physics
Thomson, Brooks/Cole, 2008

HAROLD WASHINGTON COLLEGE
One of the City Colleges of Chicago

COURSE SYLLABUS
Spring 2011

Course Title and Section: PHYSICS 235 (IAI P2900L)
Length of Course: 16 Weeks
Credit Hours: 5 Credit hours
Contact Hours: 8 Contact hours
Class Meeting Times: TBA
Building / Room: Room 904

INSTRUCTOR: Anthony escuadro
E-Mail: aescuadro@ccc.edu
Phone: 312-553-5683
Office: 903B

Office hours: (7/week for full-time faculty. 1/week per course for part-time faculty)

Course Website: ccc.blackboard.com

Course Description:
Engineering Physics I Mechanics and Wave Motion – Exploration of the laws of mechanics and wave motion using calculus to analyze practical and theoretical problems. Writing assignments, as appropriate to the discipline, are part of the course. This course is intended for students majoring in Engineering or Physics.

Pre-requisites:
Credit or Concurrent Enrollment in MATH 207 and Eligibility for English 101 or consent of department Chairperson.

Students Course is Expected to Serve:
Intended for students majoring in Engineering or Physics and for those continuing in science programs at four-year institutions

Course Objectives:
1. Recognize the role of vectors and how they are used to analyze the dynamics of single particles.
2. Understand Newton's Laws of motion and and apply these laws to problems involving translation, circular motion,and momentum.
3. Demonstrate the ability to formulate problems using the concept of energy and its conservation.
4. Understand two particle collisions in one and two dimensions and apply the appropriate conservation laws.
5. Evaluate rotational systems applying the concepts of moment of inertia, torque and angular momentum.
6. Understand small oscillations and analyze vibrating systems.
7. Analyze the properties of fluids.
8. Understand the mechanics of wave motion.

Student Learning Outcomes:

1. Express quantities in British and metric units.
2. Solve for displacement, velocity, and acceleration in mechanics problems.
3. Solve problems by expressing dymanic properties using vectors notation.
4. Analyze particle trajectories.
5. Solve problems involving circular motion.
6. Analyze problems using relative frames of reference.
7. Solve problems using Newton's Three Laws of Motion.
8. Calculate work, energy (potential/kinetic), and power. Relate these calculations to conservative and non-conservative systems.
9. Analyze collisions of two particles in one and two dimensions. Calculate impulse, and know how to apply principles of momentum conservation.
10. Solve for moment of inertia, angular velocity, angular acceleration, and torque in rotating systems.
11. Analyze systems in static equilibrium.
12. Solve problems involving the elastic properties of solids.
13. Analyze systems involving fluids using Bernoulli's equation.
14. Calculate wave properties in systems involving small oscillations.
15. Perform experiments in mechanics and wave motion and apply techniques of error analysis in analyzing the results.
16. Summarize the results of an experiment in a written report.
17. Apply the principles of mechanics and kinematics to explain events in the real world.

Required Texts and Materials:

Text: Physics for Scientists and Engineers, 2nd Edition, Randall D. Knight
Materials: Scientific calculator

Method of Instruction:

Discussion/Lecture
Lab/Lab Discussion
Group work

Definition / Statement of Active Pursuit of the Course:

District and College attendance policies are listed in the college catalog and the Student Policy Manual: http://ccc.edu/Student/files/Student_Policy_Manual_8.25.09.pdf

In addition to these general policies, you should have your own specific policy on missing class, arriving late, and leaving early. In what specific ways will attendance problems affect students' grades?)

"No Show" Policy:

(If a student registered for the course before the start time of the first class period, but 1) did not attend the first 2 classes, or 2) attended only 1 of the first 3 classes and failed to notify the instructor of his or her intentions to continue the class, the Registrar's Office will remove the student from the course.)

Academic integrity:

The City Colleges of Chicago is committed to the ideals of truth and honesty. In view of this, students

3	Coordinate Systems; Position, Velocity, and Acceleration Vectors; Vector Algebra; Projectile Motion; Relative Motion; Uniform and Nonuniform Circular Motion	Projectile Motion (Analysis of acceleration in two dimensions for object involving projectile motion)
4	Force and Interactions; Newton's Laws of Motion; Free-Body Diagrams; Newton's First and Second Law; Application's of Newton's Laws; Frictional Forces	Force table (addition of forces and determining magnitude/direction of unknown force for object in equilibrium); Measuring the coefficient of friction (measuring static/kinetic friction between various surfaces)
5	Interacting Objects; Newton's Third Law; Dynamics in Two Dimensions; Dynamics of Uniform and Nonuniform Circular Motion	Interacting objects (measuring action-reaction forces between interacting objects when in dynamic equilibrium and when accelerating)
6	Work and Kinetic Energy; Work Done by a Variable Force; Potential Energy of a System; Conservative and Non-Conservative Forces; Conservative Forces and Potential Energy	
7	Conservation of Energy; Non-Isolated and Isolated Systems; Situations involving Non-Conservative Forces and Kinetic Friction; Energy Diagrams; Power	Conservation of elastic and gravitational potential energy (analysis of transformation of energy of mass-spring system)
8	Impulse and Momentum; Conservation of Momentum; Elastic and Inelastic Collisions; Explosions; Collisions in One and Two Dimensions; Center of Mass	Collisions on a air track; two dimensional collisions (analysis of momentum before and after 1-dimensional collisions of dynamics carts/3-dimensional collisions of pucks on air table)
9	Rigid-Body Angular Acceleration; Rotational Kinetic Energy; Calculations of Moments of Inertia; Torque; Rotational Dynamics of Rigid and Rolling Bodies	Moment of inertia; rotational dynamics (measuring moment of inertia of ring/disk and comparison to calculations; measuring angular acceleration of rotating bodies)
10	Angular Momentum; Isolated Systems and the Conservation of Angular Momentum; Static Equilibrium; Elastic Properties of Solids; Stress and Strain	Balancing; Equilibrium of rigid bodies (determining equilibrium conditions of rotating rigid bodies)
11	Newton's Law of Gravitation; Gravitational Potential Energy; Satellite Orbits and Energies; Kepler's Laws	
12	Fluids; Pressure; Buoyancy and Pascal's Principle; Fluid Dynamics; Continuity and Bernoulli's Principle; Other Applications of Fluid Dynamics	Buoyancy (measuring buoyant force on submerged masses; determining specific gravity of submerged/floating objects)
13	Simple Harmonic Motion; Simple Harmonic Motion and Circular Motion; Energy in Simple Harmonic Motion; Simple and Physical Pendulums; Damped Oscillations; Forced Oscillations and Resonance	Mechanical energy conservation in simple harmonic motion (determining relationship between period of oscillation of pendulum/mass on spring and experimental parameters)

14	Wave Motion; Propagation of a Disturbance; Traveling Wave Model; Waves on a String; Reflection and Transmission; Rate of energy Transfer in Waves; Linear Wave Equation	Wavepulses on a string (analysis of longitudinal/transverse wavepulses on springs)
15	Sound and Light Waves; Speed of sound waves; Periodic sound Waves; Power, Intensity, and Decibels; The Doppler Effect	
16	The Principle of Superposition; Standing Waves on a String; Standing Sound Waves; Interference in One, Two and Three Dimensions; Resonance; Beats	Standing waves on a string; resonance tube (determining relationship between tension/wavelength for standing waves on string; determining speed of sound from wavelengths of standing sound waves in closed-open tube)

CITY COLLEGES OF CHICAGO

PHYSICS 236

Course Title:
ENGINEERING PHYSICS II – Electricity and Magnetism

Length of course: 16 Weeks
Contact Hours: 8 Contact Hours
Credit Hours: 5 Credit Hours
Lecture Hours: 4 Lecture Hours
Lab Hours: 4 Lab Hours
Weekly Plan: 8 Hours

Catalogue Description:
Exploration of electricity and magnetism as they relate to fields, forces and energy using calculus to analyze theoretical and practical problems in lecture and laboratory. Writing assignments, as appropriate to the discipline are part of the course.

Students the Course is Expected to Serve:
Intended for students majoring in Engineering or Physics and for those continuing in science programs at four-year institutions.

Pre-requisites:
Grade of 'C' or better in Physics 235 and Math 207 and eligibility for English 101 or consent of department chairperson.

Course Objectives:

1. Understand Electric fields and electric potential
2. Understand how charge is stored in capacitors
3. Recognize the role of electric fields in the movement of electric current and how resistance is determined.
4. Analyze DC circuits
5. Understand the sources of magnetic fields
6. Recognize how magnetic fields affect charges
7. Calculate inductance
8. Analyze AC circuits
9. Understand electromagnetic waves

Student Learning Outcomes:
Upon satisfactory completion of the course, students will be able to:

1. Determine the electric field due to an array of charges.
2. Calculate electric flux and electric potential due to an array of charges.
3. Evaluate the capacitance of a charge distribution.
4. Evaluate materials using the concepts of conductance, resistivity and current density.
5. Analyze DC circuits (series and parallel) using Ohm's Law and Kirchhoff's Laws for circuits.
6. Calculate trajectories of charged particles in magnetic fields.
7. Calculate the magnetic field due to an array of currents using the Bio-Savart Law.
8. Calculate the EMF generated by a changing magnetic flux using Ampere's Law.
9. Evaluate mutual and self inductance.
10. Evaluate systems by applying Maxwell's equations of electrodynamics.
11. Calculate the impedance of AC circuits and the behavior of inductors, capacitors and resistors.
12. Determine the phase constant of an AC circuit using and oscilloscope.
13. Determine the power per area of electromagnetic waves using the Poynting Vector.
14. Perform experiments in electricity and magnetism and apply techniques of error analysis in analyzing the results.
15. Summarize coherently the results of an experiment in a written report.
16. Apply the principles of electromagnetic theory to explain events in the real world.

Topical Outline:

1. Electric Fields
    - A. Properties of Electric Charges
    - B. Insulators and Conductors
    - C. Coulomb's Law
    - D. The Electric Field
    - E. Electric Dipoles
    - F. Electric Fields of Continuous Charge Distributions
    - G. Electric Field Lines
    - H. Motion of a Charged Particle in a Uniform Electric Field
2. Gauss' Law
    - A. Electric Flux
    - B. Gauss' Law
    - C. Solid Angle
    - D. Calculating Electric Fields of Charge Distributions using Gauss's Law
    - E. Experimental Proof of Gauss' Law and Coulomb's Law
    - F. Derivation of Gauss' Law
3. Electric Potential
    - A. Potential Difference and electric Potential
    - B. Potential Differences in a Uniform Electric Field
    - C. Electric Potential and Potential Energy Due to Point Charges
    - D. Electric Potential Due to Continuous Charge Distributions

E. Obtaining E from the Electric Potential
F. Potential of a Charged Conductor
H. Applications of Electrostatics

4. Capacitance and Dielectrics
   A. Definition of Capacitance
   B. Calculation of Capacitance
   C. Combinations of Capacitors
   D. Energy Stored in a Charged Capacitor
   E. Capacitors with Dielectrics
   F. Electric Dipole in an External Electric Field
   G. An Atomic Description of Dielectrics
5. Current and Resistance
   A. The Battery
   B. Electric Current
   C. Resistance and Ohm's Law
   D. The Resistivity of Different Conductors
   E. Superconductors
   F. A Model for Electrical Conduction
   G. Electrical Energy and Power
   H. Energy Conversion in Household Circuits
6. Direct Current Circuits
   A. Electromotive Force
   B. Resistors in Series and Parallel
   C. Kirchhoff's Rules
   D. RC Circuits
   E. Electrical Instruments
   F. The Wheatstone Bridge
7. Magnetic Fields
   A. Introduction
   B. Definition and Properties of the Electric Field
   C. Magnetic Force on a Current-carrying Conductor
   D. Torque on a Current Loop in a Uniform Magnetic Field
   E. Motion of a Charged Particle in a Magnetic Field
   F. Applications of the Motion of Charged Particles in a Magnetic Field
   G. The Hall Effect
   H. The Quantum Hall Effect
8. Sources of the Magnetic Field
   A. The Bio-Savart law
   B. The Magnetic Force between Two Parallel Conductors
   C. Ampère's Law
   D. The Magnetic Field of a Solenoid
   E. The Magnetic Field along the Axis of a Solenoid
   F. Magnetic Flux
   G. Gauss' Law in Magnetism
   H. Displacement Current and the Generalized Ampère's Law
9. Faraday's Law
   A. Faraday's Law of Induction
   B. Motional EMF
   C. Lenz's Law

D. Induced EMF's and Electric Fields
E. Generators and Motors
F. Eddy Currents
G. Maxwell's Equations

10. Inductance
    A. Self-inductance
    B. RL Circuits
    C. Energy in a Magnetic Field
    D. Mutual and Self Inductance
    E. Oscillations in an LC Circuit
    F. The RLC Circuit
11. Alternating Current Circuits
    A. AC Sources and Phasors
    B. Resistors in an AC Circuit
    C. Inductors in an AC Circuit
    D. Capacitors in an AC Circuit
    E. The RLC Series Circuit
    F. Power in an AC Circuit
    G. Resonance in a Series RLC Circuit
    H. Filter Circuits
    I. The Transformer and Power Transmission
12. Electromagnetic Waves
    A. Maxwell's Equations and Hertz's Discoveries
    B. Plane Electromagnetic Waves
    C. Energy Carried by Electromagnetic Waves
    D. Momentum and Radiation Pressure
    E. Radiation from an Infinite Current Sheet
    F. The Production of Electromagnetic Waves by an Antenna
    G. The Spectrum of Electromagnetic Waves

Recommended Laboratory Exercises to Illustrate:

1. Electric Fields
2. Determination of the permittivity of free space
3. Resistance , coefficient of resistivity
4. Temperature dependence of resistance- conductors and semiconductors
5. Wheatstone Bridge
6. Galvanometer & Meter Measurements, Voltmeter and ammeter
7. DC Circuits - Series & Parallel, Kirchhoff's Laws
8. Magnetic Fields, and the current balance
9. Electromagnetic induction
10. Determination of e/m
11. The Hall Effect
12. Determination of the permeability of free space and the solenoid
13. DC Circuits – RC time constant
14. DC Circuits – RL time constant
15. AC Circuit – RLC Impedance and determination of the circuit phase constant
16. Resonance in AC circuit
17. Solid state diode, the rectifier circuit

Methods of Evaluation:

15.00% Quizzes
10.00% Homework
5.00% Group participation
50.00% Objective tests
20.00% Studio/Lab performance
Total Percentage: 100%

Methods of Assessment:
At the end of the semester an Exit Assessment is given to all sections of this class to determine the areas where enhancement is needed.

Methods of Instruction:
Discussion/Lecture
Lab / Lab Discussion
Group work

Recommended Text:
Jewett and Serway Physics for Scientists and Engineers With Modern Physics
Thomson, Brooks/Cole, 2008

WRIGHT COLLEGE
One of the City Colleges of Chicago

COURSE SYLLABUS

Course Title and Section: PHYSICS 236 DF
Length of course: 16 Weeks
Contact Hours: 8 Contact Hours
Credit Hours: 5 Credit Hours
Lecture Hours: 4 Lecture Hours
Lab Hours: 4 Lab Hours
Weekly Plan: 8 Hours

COLLEGE: Wright
Instructor: Oleh S. Hanowsky
E-Mail: ohanowsky@ccc.edu
Phone: Office – 773-481-8384
Office: Room L389
Office hours: M-Tu.-W-Th.- 12:30-1:50 p.m.
LECTURE ROOM: Tu. & Th.- 9:30 a.m.-12:20 p.m.
Course Website: ccc.blackboard.com

Catalog Description:
Exploration of electricity and magnetism as they relate to fields, forces and energy using calculus to analyze theoretical and practical problems in lecture and laboratory. Writing assignments, as appropriate to the discipline are part of the course.

Students the Course is Expected to Serve:
Intended for students majoring in Engineering or Physics and for those continuing in science programs at four-year institutions.

Pre-requisites:
Credit in Physics 235 and Math 207 with a grade of 'C' or better and eligibility for English 101 or consent of department chairperson.

Course Objectives:

1. Understand electric fields and electric potential
2. Understand how charge is stored in capacitors.
3. Recognize the role of electric fields in the movement of electric current and how resistance is determined.
4. Analyze DC circuits
5. Understand the sources of magnetic fields.
6. Recognize how electric fields affect charge
7. Calculate inductance.
8. Analyze AC circuits.
9. Understand electromagnetic waves

Student Learning Outcomes:
Upon satisfactory completion of the course, students will be able to:

1. Determine the electric field due to an array of charges
2. Calculate electric flux and electric potential due to an array of charges.
3. Evaluate the capacitance of a charge distribution.
4. Evaluate materials using the concepts of conductance, resistivity and current density.
5. Analyze circuits(series and parallel) using Ohm's Law and Kirchoff's Laws for circuits.
6. Calculate trajectories for charged particles in electric and magnetic fields.
7. Calculate the magnetic field due t and array of currents using the Bio-Savart Law.
8. Calculate the EMF generated by a changing magnetic flux using Ampere's Law.
9. Evaluate mutual and self inductance.
10. Evaluate systems by applying Maxwell's equations of electrodynamics.
11. Calculate the impedance of AC circuits and evaluate the behavior of inductors, capacitors, and resistors.
12. Determine the phase constant of and AC circuit using the oscilloscope.
13. Determine the power per area of electromagnetic waves using the Poyntings Vector.
14. Perform experiments in electricity and magnetism and apply techniques of error analysis in analyzing the results.
15. Summarize coherently the results of an experiment in a written report.
16. Apply the principles of electromagnetic theory to explain phenomena in the real world.

Recommended Text:
Physics for Scientists and Engineers with Modern Physics, 8th. Ed. ISBN :978-1-4390-4844-3
Author: Serway & Jewett
Publisher: Thomson Brooks / Cole

Supplies:
You will need a scientific calculator with trigonometric, log & ln and exponential as well as square root and y^x functions. Bring to class a 6 inch ruler, one pad of graph paper (4 squares per inch), an eraser and a lead pencil. All work is to be done in pencil - ink is not acceptable. Please take all lecture notes in an 81/2" x 11" notebook which has a spiral wire binding and date the entries to maintain order.

Lectures:
The first lecture of the week will cover the major topics in the chapter and will last approximately 2hr.30min. All material which will be the source of test questions cannot be discussed in this short time so that reading the book is essential if one wishes to learn all the material.

The second lecture will be devoted entirely to problem solving and experimentation. It is obvious that all the problems cannot be done during this period so it is important that you keep up with the homework and address at this time only those problems which gave you trouble.

Homework:
You are expected to do all the problem assignments in preparation for the exams. Solutions to all the problems will be available at the reserve desk of your library. You are urged to xerox them. Your homework problems and

the supporting calculations will be collected on the day of the problem session. Each homework assignment will be worth 5 pts.

Late Assignments:
Late assignments will be given ½ credit. No credit will be given if they are more than 10 days late.

Quizzes:
10 quizzes x 10pts each (**no make-ups**)

Exams:
There will be FOUR MAJOR EXAMS each carrying a value of 100pts. If a genuine hardship exists and you cannot attend the exam you must contact me **BEFORE THE TIME OF THE EXAM** if you expect an accommodation to be made. (messages can be left with the departmental secretary 773-481-8377 or by voice mail and please indicate where you can be reached). Usually an exam is expected to made up **no later than three days** following an absence. **A valid medical excuse which can be documented is required.** If the excuse is considered frivolous no make-up exam will be given and a grade of zero will be entered into the record (Only **one make-up** will be allowed per semester)

Experiments:
You will perform ten experiments and each will require a report and have a value of 20 pts.
Diagrams, graphs and a rudimentary error analysis are expected elements in each report.

Grading:
The major exams will sum to produce the final average. This grading scale may vary by ±5pts. depending on the class average and standard deviation.

A=100-85, B=85-70, C=70-55, D=55-40, F=40-0

Attendance:
One point shall be awarded for every completely attended class (you arrived on time and were present during the whole period and did not leave early).

Exams	300 pts	Homework	65 pts
Experiments	100 pts	Attendance	30 pts
Quizzes	100	Total	**595 pts**

Active Pursuit:
Active pursuit constitutes participation in at least 50% of all lectures, 50% of all home work, 50% of all quizzes, 50% of all tests, and 80% of all experiments (successful completion of an experiment constitutes participation in the lab and the submission of a report). A student not actively participating in any one of the above activities can be dropped at mid-term and receive a grade of ADW.

No Show Policy:
Students not attending at least 2 of the first three classes and not notifying the instructor of their intensions of to continue the class will be dropped.

Academic integrity:

Students are expected to do their work honestly, avoid plagiarism and cheating. Violations will result in a grade of "F" for the activity or for the course.

Disability Access Center: Please note: Any student with a disability, including a temporary disability, who is eligible for reasonable accommodations should contact the Disability Access Center.

Student Conduct:
Students are expected to respect the rights of others and not to impair the educational mission of the college. Students may be expelled for : dishonesty, stealing, forgery, physical or verbal obuse, threats, intimidation, harassment, physical endangerment, possession of weapons(knives,firearms,explosives)

Disability Access Center: Please note: Any student with a disability, including a temporary disability, who is eligible for reasonable accommodations should contact the Disability Access Center.

Classroom etiquette:
Cell phones, PDAs, food, inappropriate talking, leaving the classroom without the instructor's consent is not allowed.

Topical Outline:

Spring 2011 Physics 236-DF			
week	Week of	Chapters Serway-Jewett Eigth Ed.	Homework problems (problem sessions)
1	Jan.17	23 Electric Fields problems-23 Exp.1 Electric field Mapping	pg682 P- 2,9,10,23,29,30,31,39,40,45,59
2	Jan.24	24 Gauss' Law Quiz 1	pg705 P-1,4,11,15,22,23,30,32,40,55
3	Jan.31	problems-24 Exp. 2 Wheatstone Bridge	
4	Feb.7	25 Electric Potential problems-25 Quiz 2	pg733 P-1,3,14,16,18,35,39,42,44,47,65
5	Feb.14	Review **Exam 1** (Chapters 23,24,25)	
6	Feb. 21	26 Capacitance and Dielectrics problems-26	pg764 P-2,8,11,13,23,34,36,47,49,71
		Quiz 3 Exp. 3 Determination of permittivity of free space	
7	Feb.28	27 Current and Resistance problems-27 Exp.4 Coefficient of resistivity	pg788 P-3,7,14,19,25,29,37,41,57

8	Mar.7	Exp. 5 Series and parallel cicuits 28 Direct Current Circuits Quiz 4	pg818 P-1,9,17,23,32,34,39,42,49
9	Mar.14	problems-28 Exp.6 RC Time Constant	
10	Mar.21	**Exam 2** Chap. (23,24,25,26,27,28) 29 Magnetic Fields Quiz 5	pg852 P-5,8,12,15,27,37,47,51
11	Mar.28	problems-29 30 Sources of magnetic Fields Exp.7 Determination of the permeability of free space	pg884 P-5,7,19,23,27,29,36,45,47
12	Apr.4	problems-30 31 Faraday's Law Quiz 6 problems-31	pg916 P-7,9,11,17,20,23,28,33,36
13	Apr.11	**Exam 3** (Chap 28,29,30 31) 32 Inductance Exp.8 Magnetic fields e/m ratio	pg944 P-4,6,16,21,26,29,33,37,49,51
	Apr.18	Spring Break	
14	Apr.25	Exp. 9 L/R Time Constant (Demo) problems-32 Quiz 7 problems-31	
15	May 2	33 Alternating Current Exp.10 AC Circuits, Impedance, phase constant	pg976 P-4,10,14,20,24,36,45,53,57
16	May 19	Chap 34 Electromagnetic Waves problems-34 Quiz 8 **Final Exam** Chapters (29,30,31,32,33,34)	pg1002 P-3,4,8,10,17,30,33,40,45

Recommended Laboratory Exercises to Illustrate:

1. Electric Fields
2. Determination of the permittivity of free space
3. Resistance , coefficient of resistivity
4. Temperature dependence of resistance- conductors and semiconductors
5. Wheatstone Bridge
6. Galvanometer & Meter Measurements, Voltmeter and ammeter
7. DC Circuits - Series & Parallel, Kirchhoff's Laws
8. Magnetic Fields, and the current balance
9. Electromagnetic induction
10. Determination of e/m
11. The Hall Effect
12. Determination of the permeability of free space and the solenoid
13. DC Circuits – RC time constant
14. DC Circuits – RL time constant

15. AC Circuit – RLC Impedance and determination of the circuit phase constant
16. Resonance in AC circuit
17. Solid state diode, the rectifier circuit

Methods of Evaluation:

15.00% Quizzes
10.00% Homework
5.00% Group participation
50.00% Objective tests
20.00% Studio/Lab performance
Total Percentage: 100%

Methods of Assessment:
At the end of the semester an Exit Assessment is given to all sections of this class to determine the areas where enhancement is needed.

Methods of Instruction:
Discussion/Lecture
Lab / Lab Discussion
Group work

CITY COLLEGES OF CHICAGO

PHYSICS 237

Course Title:
Engineering Physics III- Heat, Light and Modern Physics

Length of course: 16 Weeks
Contact Hours: 8 Contact Hours
Credit Hours: 5 Credit Hours
Lecture Hours: 4 Lecture Hours
Lab Hours: 4 Lab Hours
Weekly Plan: 8 Hours

Catalogue Description:
Exploration of the laws of heat, light, and modern physics and analysis of practical and theoretical problems through the use of calculus. Writing assignments, as appropriate to the discipline, are part of the course.

Students the Course is Expected to Serve:
Intended for students majoring in Engineering and for those continuing in science programs at four-year institutions.

Pre-requisites:
Grade of 'C' or better in Math 207 and Physics 235 and eligibility for English 101 or consent of department chairperson.

Course Objectives:

1. Understand the concept of temperature and internal energy
2. Perform calculations involving calorimetry
3. Apply the First law of Thermodynamics
4. Understand entropy and the second law of thermodynamics
5. Understand heat engines and summarize thermodynamic cycles.
6. Evaluate curved surfaces and their reflective properties
7. Determine the refractive index of light in solids
8. Examine double slit and single slit diffraction interference patterns, diffraction gratings and interference in thin films.
9. Understand Special Relativity
10. Understand the photo-electric effect, the Compton effect, and the De Broglie hypothesis
11. Demonstrate how the Bohr model of the hydrogen atom leads to an understanding of spectral lines and atomic structure.
12. Understand the principles of Quantum mechanics and the Schrödinger equation as it relates to particles under boundary conditions
13. Explain nuclear structure, and radioactive decay
14. Understand the operation of semiconductor devices

Student Learning Outcomes:
Upon satisfactory completion of the course, students will be able to:

1. Calculate the expansion of solids with changes in temperature.
2. Perform calculations using the ideal gas law.
3. Determine the resulting temperature when materials at differing temperatures are brought together.
4. Calculate the rate of heat exchange.
5. Calculate thermodynamic quantities in isothermal, adiabatic, isobaric, and isochoric processes.
6. Evaluate heat engines in regards to all thermodynamic quantities.
7. Calculate focal lengths, image and object locations, and magnifications for curved surfaces.
8. Calculate focal lengths, image and object locations, and magnifications for lenses.
9. Evaluate single slit and double slit interference patterns.
10. Solve problems involving diffraction gratings.
11. Calculate physical quantities for particles traveling at relativistic speeds.
12. Calculate parameters involved in the photo-electric effect.
13. Calculate parameters involved in the Compton Effect
14. Evaluate electronic transitions in the Bohr atom.
15. Calculate binding energies of nucleons.
16. Determine half lives in radioactive decay.
17. Determine reaction energies and particle energies in alpha and beta radioactive decays.
18. Determine energy levels using the Schrödinger equation for a particle in a box and the hydrogen atom.
19. Calculate the circuit parameters for a simple diode and single transistor.
20. Perform experiments involving heat, light and modern physics and apply techniques of error analysis in analyzing the results.
21. Summarize coherently the results of an experiment in a written report.
22. Apply the principles learned in heat, light, and modern physics to explain events in the real world.

Topical Outline:
Topical Course Outline:

HEAT
A. Temperature
Zeroth Law of Thermodynamics
Measuring Temperatures
Temperature Scales
Thermal Expansion

B. First Law of Thermodynamics
1. Heat and internal energy, Specific Heat

2. Mechanical Equivalent of Heat
3. Latent Heat
4. Heat Transfer
5. Heat and Work/First Law of Thermodynamics
6. Some applications of the First Law of Thermodynamics

C. Kinetic Theory of Gases
1. Molecular model of Ideal Gases
2. Kinetic Calculations
3. Specific Heats of an Ideal Gas
4. The isothermal and adiabatic process
5. Equipartition of Energy
6. Mean Free Path
7. Distribution of Molecular Speed

D. Second Law of Thermodynamics/Entropy
1. Heat engines and the Second Law
2. Heat pumps and refrigerators
3. Carnot Cycle, reversible and irreversible processes
4. Second Law of Thermodynamics ,entropy
5. Efficiency of Engines
6. Entropy LIGHT

A. Geometrical Optics
1. Reflection and Refraction
2. Huygens's Principle
3. Law of refraction
4. Total Internal Reflection
5. Brewster's Law
6. Spherical Waves
7. Thin lenses
8. Optical instrument

B. Interference
1. Wave Optics
2. Young's Experiment
3. Coherence
4. Interference from films
5. Michelson's Interferometer

C. Diffraction
1. Diffraction from a single slit
2. Diffraction from a circular aperture
3. Diffraction form a double slit/multiple slits
4. Diffraction Gratings

5. X-ray diffraction MODERN PHYSICS

A. Special Relativity
1. Lorentz transformations.
2. Relativistic Linear Momentum
3. Relativistic Energy
4. Relativistic Doppler Shift

B. Introduction to quantum physics
1. Black-body radiation/Planck's Radiation Law
2. Photoelectric effect/Einstein's Photon Theory
3. Compton Effect
4. Wave properties of particles-De Broglie hypothesis
5. Line Spectra/Bohr's Theory of the hydrogen atom

C. Quantum Mechanics
1. Matter Waves
2. Wave Mechanics
3. Physical Meaning of the wave function
4. The uncertainty principle
5. Wave particle duality/complementarily principle
6. The Schrödinger Equation
7. The quantum particle under boundary conditions-infinite and finite potential well
8. Tunneling through a potential barrier

D. The One Electron Atom
1. Hydrogen atom quantum numbers
2. Hydrogen atom wave functions
3. Angular Momentum/magnetism
4. Spinning Electron
5. The atom in a magnetic field.

F. Nuclear Physics
1. Atomic Nucleus
2. Nuclear properties
3. Binding energy
4. Radioactivity-Radioactive decay
5. Nuclear magnetic resonance and magnetic resonance imaging
6. Nuclear reactions, fusion and fission
7. Nuclear reactors

G. Molecules and solids
1. Molecular bonds
2. Energy states and molecular spectra

3. Free electron theory of metals
4. Band theory of solids
5. Electric conduction in metals, insulators, and semiconductors
6. Semiconductor devices

H. Particle Physics
1. The fundamental forces in nature
2. Classification of particles
3. Quarks
4. The cosmic connection

Laboratory Exercises:
1. Thermal expansion
2. Specific heat
3. Mechanical equivalent of heat
4. Latent heat of fusion and vaporization
5. Boyle's Law and Gay-Lussac's Law
6. Index of refraction, Snell's Law, the Prism Spectrometer and Dispersion
7. Mirrors and lenses
8. Diffraction grating, measuring the wavelengths of light
9. Photoelectric effect
10. Line Spectra and the Rydberg constant
11. Radioactive decay and half-life
12. Absorption of radioactive radiation
13. Beta Decay Energy
14. Solid state components

Calendar:

Methods of Evaluation:
15.00% Quizzes
10.00% Homework
5.00% Group participation
50.00% Objective tests
20.00% Studio/Lab performance
Total Percentage: 100%

Methods of Assessment:
At the end of the semester an Exit Exam is given to all sections of this class to determine the areas where enhancement is needed

Methods of Instruction:
Lab/Lab Discussion
Group work
Lecture

Discussion/Lecture

Recommended Text:
1. Jewett and Serway Physics for Scientists and Engineers with Modern Physics Thomson, Brooks/Cole,

WRIGHT COLLEGE
One of the City Colleges of Chicago

COURSE SYLLABUS

Course Title and Section: PHYSICS 237 DF
Length of course: 16 Weeks
Contact Hours: 8 Contact Hours
Credit Hours: 5 Credit Hours
Lecture Hours: 4 Lecture Hours
Lab Hours: 4 Lab Hours
Weekly Plan: 8 Hours

COLLEGE: Wright
Instructor: Oleh S. Hanowsky
E-Mail: ohanowsky@ccc.edu
Phone: Office – 773-481-8384
Office: Room L389
Office hours: M-Tu.-W-Th.- 12:30-1:50 p.m.
LECTURE ROOM: Tu. & Th. Room S335- 9:30 a.m.-12:20 p.m.
Course Website: ccc.blackboard.com

Catalog Description:
Exploration of the laws of heat, light, and Modern Physics and analysis of practical and theoretical problems through the use of calculus. Writing assignments, as appropriate to the discipline, are part of the course.

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7. Calculate focal lengths, image and object locations, and magnifications for curved surfaces.
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9. Evaluate single slit and double slit interference patterns.
10. Solve problems involving diffraction gratings.
11. Calculate physical quantities for particles traveling at relativistic speeds.
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15. Calculate binding energies of nucleons.
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18. Determine energy levels using the Schrödinger equation for a particle in a box and the hydrogen atom.
19. Calculate the circuit parameters for a simple diode and single transistor.
20. Perform experiments involving heat, light and modern physics and apply techniques of error analysis in analyzing the results.
21. Summarize coherently the results of an experiment in a written report.
22. Apply the principles learned in heat, light, and modern physics to explain events in the real world.

Recommended Text:

Physics for Scientists and Engineers with Modern Physics, 8th. Ed. ISBN :978-1-4390-4844-3
Author: Serway & Jewett
Publisher: Thomson Brooks / Cole

Supplies:

You will need a scientific calculator with trigonometric, log & ln and exponential as well as square root and y^x functions. Bring to class a 6 inch ruler, one pad of graph paper (4 squares per inch), an eraser and a lead pencil. All work is to be done in pencil - ink is not acceptable. Please take all lecture notes in an 81/2" x 11" notebook which has a spiral wire binding and date the entries to maintain order.

Lectures:

The first lecture of the week will cover the major topics in the chapter and will last approximately 2hr.30min. All material which will be the source of test questions cannot be discussed in this short time so that reading the book is essential if one wishes to learn all the material.

The second lecture will be devoted entirely to problem solving and experimentation. It is obvious that all the problems cannot be done during this period so it is important that you keep up with the homework and address at this time only those problems which gave you trouble.

Homework:
You are expected to do all the problem assignments in preparation for the exams. Solutions to all the problems will be available at the reserve desk of your library. You are urged to xerox them. Your homework problems and the supporting calculations will be collected on the day of the problem session. Each homework assignment will be worth 5 pts.

Late Assignments:
Late assignments will be given ½ credit. No credit will be given if they are more than 10 days late.

Quizzes:
10 quizzes x 10pts each (**no make-ups**)

Exams:
There will be FOUR MAJOR EXAMS each carrying a value of 100pts. If a genuine hardship exists and you cannot attend the exam you must contact me **BEFORE THE TIME OF THE EXAM** if you expect an accommodation to be made. (messages can be left with the departmental secretary 773-481-8377 or by voice mail and please indicate where you can be reached). Usually an exam is expected to made up **no later than three days** following an absence. **A valid medical excuse which can be documented is required.** If the excuse is considered frivolous no make-up exam will be given and a grade of zero will be entered into the record (Only **one make-up** will be allowed per semester)

Experiments:
You will perform ten experiments and each will require a report and have a value of 20 pts.
Diagrams, graphs and a rudimentary error analysis are expected elements in each report.

Grading:
The major exams will sum to produce the final average. This grading scale may vary by ±5pts. depending on the class average and standard deviation.

A=100-85, B=85-70, C=70-55, D=55-40, F=40-0

Attendance:
One point shall be awarded for every completely attended class (you arrived on time and were present during the whole period and did not leave early).

Exams	300 pts	Homework	65 pts
Experiments	100 pts	Attendance	30 pts
Quizzes	100	Total	**595 pts**

Active Pursuit:
Active pursuit constitutes participation in at least 50% of all lectures, 50% of all home work, 50% of all quizzes, 50% of all tests, and 80% of all experiments (successful completion of an experiment constitutes participation in

the lab and the submission of a report). A student not actively participating in any one of the above activities can be dropped at mid-term and receive a grade of ADW.

No Show Policy:
Students not attending at least 2 of the first three classes and not notifying the instructor of their intensions of to continue the class will be dropped.

Academic integrity:
Students are expected to do their work honestly, avoid plagiarism and cheating. Violations will result in a grade of "F" for the activity or for the course.

Student Conduct:
Students are expected to respect the rights of others and not to impair the educational mission of the college. Students may be expelled for : dishonesty, stealing, forgery, physical or verbal obuse, threats, intimidation, harassment, physical endangerment, possession of weapons(knives,firearms,explosives)

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Topical Outline:

Fall 2010 Physics 237-DF

week	Week of	Chapters Serway 7th Ed.	Homework problems
1	Aug. 23	19 Temperature problems	1,3,7,9,13,17,21,23,3[illegible],47,54
2	Aug. 30	20 Heat and the first Law Exp1. Linear Expansion problems	2,7,11,14,19,21,22,28,31,37,39
3	Sept. 6	21 Kinetic theory of gases Exp 2.Latent heat 21 Kinetic theory of gases	7,12,16,20,25,27,[illegible],33
4	Sept. 13	problems Exp 3.Gas Laws 22 Heat engines	1,3,7,9,13,15,20,29,30,33,38
5	Sept. 20	22 Heat engines Exp 4 Specific Heat problems	
6	Sept. 27	**Exam 1 Chapters 19,20,21,22** 35 Nature of Light	9,1[illegible]8,21,29,31,34,38,55
7	Oct. 4	problems Exp 5. Index of refraction 36 Geometric Optics	3,4 3,17,19,22,24,29,33,40,45,47
8	Oct. 11	problems Exp. 6 Transmission Grating 37 Interference of light waves	1,3.5,13,17,19,26,31,34

9	Oct. 18	problems Exp 7. Mirrors and Lenses 38 Diffraction and polarization	1,7,11,13,20,23,30,31,34,36
10	Oct. 25	problems **Exam 2 Chapters 35,36,37,38**	
11	Nov. 1	39 Relativity Exp.8 Line Spectra-Rydberg constant	1,2,5,9,17,20,24,25,35,43
12	Nov. 8	problems 40.1-.5 Introduction to quantum Physics 42.1-.3 Atomic Physics	5,9,14,15,21,22,28,34,35 1,5,7,10
13	Nov. 15	problems Exp. 9 Radioactive Decay Thanksgiving	
14	Nov. 22	44.1-.5 Nuclear Structure problems	5,7,12,17,19,21,33
15	Nov. 29	41.1-.3Quantum Mechanics sec 1-5 problems Exp. 10. Beta decay energy	3,9,15,18
16	Dec. 6	**Final Exam Chapters 39,40,42,44,41**	

Recommended Laboratory Exercises to Illustrate:

1. Electric Fields
2. Determination of the permittivity of free space
3. Resistance , coefficient of resistivity
4. Temperature dependence of resistance- conductors and semiconductors
5. Wheatstone Bridge
6. Galvanometer & Meter Measurements, Voltmeter and ammeter
7. DC Circuits - Series & Parallel, Kirchhoff's Laws
8. Magnetic Fields, and the current balance
9. Electromagnetic induction
10. Determination of e/m
11. The Hall Effect
12. Determination of the permeability of free space and the solenoid
13. DC Circuits – RC time constant
14. DC Circuits – RL time constant
15. AC Circuit – RLC Impedance and determination of the circuit phase constant
16. Resonance in AC circuit
17. Solid state diode, the rectifier circuit

Laboratory Exercises:

1. Thermal expansion
2. Specific heat
3. Mechanical equivalent of heat
4. Latent heat of fusion and vaporization
5. Boyle's Law and Gay-Lussac's Law
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8. Diffraction grating, measuring the wavelengths of light
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12. Absorption of radioactive radiation
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