

**Grande Prairie Regional College
Department of Science and Technology**

PC 1260 B3 – Fluids, Fields and Radiation
Winter 2002
3(3-0-3)UT

Administrative Details

Instructor: Jaime P. Santiago
J209
539-2865
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Lectures: T 11:30 am – 12:50 pm J204
R 11:30 am – 12:50 pm J229

Laboratory Work: T or W or F 2:30 – 5:20 pm J103

Marks Distribution:

- Assignments: 15 %
- Laboratory: 20 % (Note: must pass lab to pass course!)
- Midterm Exam 25 %
- Final Exam 40 %

Midterm Exam:

- Date: Wednesday, February 20, 2002 (tentative)
- Place: TBA
- Time: TBA

**Textbook and
Laboratory Manual:**

Physics 5th Edition
John D. Cutnell and Kenneth W. Johnson
John Wiley and Sons, Inc.

Physics 124/126 Laboratory Manual
Department of Physics
University of Alberta

Course Description and Syllabus

Calendar Description

PC 1260 – Fluids, Fields and Radiation

This course is a continuation of PC 1240 for students in life and medical sciences. Fluid statics and dynamics, gases, kinetic interpretation, electrostatics; currents and circuits; magnetic field; electromagnetic induction; nuclear radiation, its interaction with matter and applications.

Prerequisites: PC 1240

Note: Credit may be obtained for only one of PC 1000, PC 1090, PC 1260, PC 1300 or PC 1460.

Syllabus

- Chapter 11: Fluids**
Mass density, pressure, variation of pressure with depth, Pascal's Principle, Archimedes' Principle, fluids in motion, equation of continuity, Bernoulli's equation, viscous flow
- Chapter 18: Electric Forces and Electric Fields**
Electric charge, conservation of charge, conductors and insulators, Coulomb's Law, electric field and field lines, Gauss' Law
- Chapter 19: Electric Potential Energy and Electric Potential**
Potential energy, electric potential and potential difference, equipotential surfaces, capacitors and dielectrics
- Chapter 20: Electric Circuits**
Electromotive force and current, Ohm's Law, resistance and resistivity, power, alternating current, series, parallel and series-parallel circuits, Kirchoff's Rules, capacitors in series and parallel, RC circuits
- Chapter 21: Magnetic Forces and Magnetic Fields**
Magnetic field, force on moving charged particle, force on current in a magnetic field, torque on a current-carrying coil, magnetic fields produced by currents, Ampere's Law, magnetic materials
- Chapter 22: Electromagnetic Induction**
Induced emf and current, motional emf, magnetic flux, Faraday's Law, Lenz's Law, electric generator, mutual and self-inductance, transformers.
- Chapter 23: Alternating Current Circuits**
Capacitors and capacitive reactance, inductors and inductive reactance, RLC circuits, resonance
- Chapter 31: Nuclear Physics and Radioactivity**
Nuclear structure, strong nuclear force, mass defect and binding energy, radioactivity, neutrino, radioactive decay and activity, radioactive decay series, radioactive dating, radiation detectors

Chapter 32: Ionizing Radiation, Nuclear Energy and Elementary Particles
Biological effects of ionizing radiation, induced nuclear reactions, nuclear fission and fusion, nuclear reactors. (*Time permitting, I will give one lecture on controlled thermonuclear fusion including both magnetic and inertial confinement fusion.*)

Laboratory Component
(Based on *U of A Lab Manual*,
Consult with lab instructor for lab experiment dates.)

Experiment No.	Lab Title
11	Properties of Fluids
12	Terminal Velocity
Handout	Inverse Square Law Force
14	Electrostatic Potentials
15	Capacitance
16	Resistance
17	Measurement of e/m for Electrons
18	Magnetic Fields
19	Detection of Radiation: Geiger-Muller Counter (Demo)
Handout	Balmer Series

Assignments

There will be approximately 10 problem sets. All problems will be taken from the course textbook.

Assignments constitute 15 % of your course mark.

The list of assignment problems and due dates will be provided later in class.

No late assignments will be accepted.