Student Services

Grande Prairie Regional College

Department of Science

W.94

PC 1370 MECHANICS 3.8(3-2/2-3/2) UT(3.8) Fall
U of A Equivalent - Phys 137
Course Information

Calendar Description: Oscillations, wave motion, sound waves, electric charge, electric field, electric potential, Gauss' Law, capacitance, electric current, electromotive forces and DC circuits.
PC 1370 Wave Motion and Electricity 3.8(3-1-1.5) UT(3.8)
Prerequisite: PC 1310

Instructor:	Dr. Jaime P. Santiago J209, 539-2865	
Lecture:	TR	9:30 - 10:50 a.m., J226
Laboratory:	T	3:00 - 5:50 p.m., J103
Seminar:	T	1:30 - 2:30 p.m., J202 (Section S2)
	R	1:30 - 2:30 p.m., J202 (Section S1)
Textbook:	**Physics for Scientists and Engineers, 3rd Edition, Updated Version** by R. A. Serway (Saunders)	
Laboratory Manual:	**PHYSICS Laboratory Manual** **EN PH 131** **PHYS 137/141/143** by Physics Department, University of Alberta (McGraw-Hill Ryerson)	

Grading:		
	Assignments	10%
	Laboratory	20%
	Midterm Examination	25%
	Final Examination	45%

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Marking:

Students must pass the laboratory course in order to pass the course. A student who fails to pass the laboratory course must repeat the entire course. Students who have previously taken the course and passed the laboratory component with at least 65% may choose not to repeat the lab.

Re-writing of the final examination may be allowed in special circumstances under rules approved by the College.

Seminars:

Students will be required to solve 2 to 3 problems to be handed in at the end of the 1-hour period. Help in doing these problems will be available from the instructor. Students absent during seminars will receive a mark of zero unless excused by the instructor for valid reasons. If a seminar session is canceled due to weather, fire alarms, and/or other College sanctioned activities, students in the canceled seminar will not be required to hand them in for marking. Appropriate adjustments will be made to their grades.

Assignments:

There will be approximately 12 problem sets in this course. Assignments are normally handed out on Tuesdays and due one week later. The actual number of assignments and their due dates will depend on class progress. Appropriate adjustments will be made to take into consideration topics already covered in the lecture.

Laboratory:

Laboratory work is performed every two weeks alternating with the chemistry lab. At any time, half the class will be doing the physics lab while the other half will be doing the chemistry lab. There is no final exam in the lab. Lab mark is totally based on individual lab reports.

Laboratory reports are due at the end of the period. No late reports will be accepted. Lab reports should be handwritten (pencils are OK) on black Physics Laboratory Books available at the bookstore. A student who misses a lab due to illness or other extreme reasons may perform the lab at a different time if the lab equipment for the experiment is still set up or if the lab technician agrees to set them up again. The lab technician has sole discretion whether to set up the equipment again or not. If the equipment is not available anymore and the absence is excused by the instructor, the student will not be required to hand the lab and his/her mark adjusted accordingly.

Midterm Examination:

The midterm exam is tentatively scheduled for **15 February, 1994 from 9:30 a.m. to 10:50 a.m.** Writing of midterm exams will done in the regularly assigned classroom. There is no provision for rescheduling if a student misses the exam.

Final Examination:

Final exams are 3 hours long and are normally held at the College Gym. Dates and times will be announced later by the registrar's office. Any conflicts should be reported to the registrar.

PC 1310 - MECHANICS
Course Outline (Winter, 1994)

A. Oscillatory Motion (3) January T4, R6, T3, Chapter 13 of Serway

1. Simple Harmonic Motion - amplitude, frequency, period, phase, phase constant
2. Simple Harmonic Oscillator
   - mass attached to a spring
   - simple pendulum, physical pendulum
   - energy of harmonic oscillator
3. Damped Oscillations
4. Forced Oscillations and Resonance

B. **Wave Motion** (2) January R13, T18, Chapter 16 of Serway

1. Types of Waves - transverse and longitudinal waves
2. One-dimensional Traveling Waves
   - amplitude, frequency, phase, phase velocity, group velocity, particle velocity
   - superposition and interference of waves
   - harmonic waves
3. Waves on a String
   - phase velocity
   - reflection and transmission of waves
   - harmonic waves
   - energy transmitted

C. Sound Waves (2) January R20, T25, Chapter 17 of Serway

1. Velocity, energy and intensity, intensity level (dB)
2. Harmonic Sound Waves
3. Spherical and Plane Waves
4. Doppler Effect
5. Shock Waves

D. Superposition and Standing Waves (1) January 27, Chapter 18 of Serway

1. Superposition and Interference of Harmonic Waves
2. Standing Waves
   - in a string fixed at two ends
   - in air columns
3. Beats

E. Electric Fields (4) February T1, R3, T8, R10, Chapter 23 of Serway

1. Properties of Electric Charges, Insulators and Conductors
2. Coulomb's Law
3. Electric Field
   - point charges
   - continuous charge distribution

4. Electric Field Lines

5. Motion of Charged Particles in an Electric Field

The midterm exam is expected to be based on material up to the end of section E3. The exact details will depend on how the term progresses. The midterm exam will be on Tuesday, 15 February, 1994 at 9:30 a.m. The exam is 1 hour and 20 minutes long.

F. Gauss' Law (3) February R17, March T1, R3, Chapter 24 of Serway

1. The Electric Flux

2. Gauss' Law

3. Applications of Gauss' Law to Charged Insulators

4. Conductors in Electrostatic Equilibrium

G. Electric Potential (3) March T8, R10, T15

1. Potential Difference and Electric Potential
   - potential differences in a uniform electric field

2. Electric Potential and Potential Energy
   - point charges
   - continuous charge distributions

3. Obtaining E from the Electric Potential

H. Capacitance and Dielectrics (3) March R17, T22, R24 Chapter 26 of Serway

1. Definition of Capacitance

2. Calculation of Capacitance

3. Combination of Capacitors

4. Energy Stored in Capacitors

5. Capacitors with Dielectrics

6. Electric Dipole in an External Electric Field

I. Current and Resistance (3) March T29, R31, April T5 Chapter 27 of Serway

1. Battery and Source of EMF

2. Electric Current, Resistance and Ohm's Law

3. Resistivity
   - temperature dependence
   - model for electrical conduction

4. Electrical Energy and Power; Energy Conversion

J. Direct Current Circuits (3) April R7, T12, R14 Chapter 28 of Serway

1. Electromotive Force and Internal Resistance

2. Resistors in Series and Parallel

3. Kirchoff's Rules or Laws

4. RC Circuits

5. Electrical Measurements