

## PC 1090 – Introduction to University Physics II

Winter Session – 2000

University of Alberta Equivalent – Physics 109

3(3-1, 5-3) 1/1

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*This is a non-calculus course in physics for students without Physics 30. to be taken in sequence with PC 1080. Waves, sound, fluids, geometrical and physical optics, heat and thermodynamics.*

Prerequisite: PC 1080

Note: Credits may be obtained for only one of PC 1000, 1090, 1300 or 1370.

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<b>Schedule</b>	Lecture	8:30 – 9:50 Tuesday, Thursday, Friday
	Laboratory	14:30 – 17:20 Monday
<b>Web Site (old)</b>	<a href="http://www.gprc.ab.ca/courses_and_programs/engineering/pc1090.html">http://www.gprc.ab.ca/courses_and_programs/engineering/pc1090.html</a>	
<b>(new)</b>	<a href="http://www.gprc.ab.ca/engineering/pc1090.htm">http://www.gprc.ab.ca/engineering/pc1090.htm</a>	
<b>Laboratories</b>	Ten weekly experiments every Monday starting January 10, 2000	
<b>Assignments</b>	Up to 11 problem sets due every Tuesday starting January 11, 2000	
<b>Marks</b>	Problem Sets	15 %
<b>Distribution</b>	Laboratory Work	20 % Students must pass the lab to pass the course.
	Midterm Exam 1	15 % Tuesday, February 15, 2000
	Midterm Exam 2	20 % Tuesday, March 21, 2000
	Final Exam	30 %
<b>Required</b>	J. D. Cutnell and K. W. Johnson: <i>Physics, 4<sup>th</sup> Edition</i>	
<b>Texts</b>	University of Alberta: <i>Physics 100, 101, 108, 109 Laboratory Manual</i>	

## Lecture Topics

TOPIC	TIME (Days)	CONCEPTS TO BE LEARNED
Fluids	4	Mass density, pressure, Pascal's Principle, Archimedes Principle, Equation of Continuity, Bernoulli's Equation, viscous flow
Temperature and Heat	5	Temperature scales, thermometers, linear and volume thermal expansion, heat and internal energy, specific heat capacity, latent heat and phase change, humidity
Heat Transfer	2	Convection, conduction and radiation of heat
Ideal Gases	3	Molecules, molecular mass, the mole and Avogadro's number; ideal gas law, kinetic theory of gases; diffusion
Thermodynamics	5	Zeroth and First Laws of Thermodynamics, thermal processes, specific heat capacity; Second Law of Thermodynamics, entropy; heat engines, Carnot's principle and the Carnot engine, refrigerators and heat pumps; Third Law of Thermodynamics
Waves and Sound	3	Waves, speed of a wave, waves on a string, sound, speed of sound, intensity of sound, decibels; the Doppler Effect
Superposition and Interference	3	Superposition principle, constructive and destructive interference; diffraction, beats; transverse and longitudinal waves; musical instruments
Reflection of Light	2	Wave fronts and rays, reflection of light; image formation by plane and spherical mirrors; the mirror equation and magnification
Refraction of Light	5	Index of refraction, Snell's Law, total internal reflection; polarization; dispersion; thin lenses, image formation by lenses; the lens equation and magnification, lens combinations, optical instruments
Interference and the Wave Nature of Light	3	Double slit, thin films, diffraction, diffraction gratings

## Assignments

Assignment	Due Date	Problems
1	January 11	Chapter 11 - # 7, 17, 31, 39, 48
2	January 18	Chapter 11 - # 50, 65, 71, 72, 82
3	January 25	Chapter 12 - # 8, 12, 24, 32, 53
4	February 1	Chapter 12 - # 65, 80; Chapter 13 - # 10, 14, 16
5	February 8	Chapter 13 - #24; Chapter 14 - # 9, 18, 27, 40, 48
6	February 29	Chapter 15 - # 3, 14, 30, 37, 58, 69, 70
7	March 7	Chapter 16 - # 20, 29, 44, 58, 70, 80
8	March 14	Chapter 17 - # 9, 15, 23, 33, 34, 50
9	March 28	Chapter 25 - # 7, 10, 11, 26(a only), 41
10	April 4	Chapter 26 - # 16, 22, 32, 36, 45, 54, 58
11	April 11	Chapter 26 - # 65, 69, 78; Chapter 27 - # 7, 19, 48

## Laboratory Schedule

Lab. No.	Date	Title
1	January 10	Properties of Fluids
2	January 17	Terminal Velocity
3	January 24	Constant Volume Gas Thermometer
4	January 31	Mechanical Equivalent of Heat
5	February 7	Oscilloscope
6	February 28	Standing Waves on a String
7	March 6	Speed of Sound in Air
8	March 13	Geometrical Optics
9	March 20	Interference
10	March 27	Computers in Physics Labs