



DEPARTMENT SCIENCE

COURSE OUTLINE – FALL 2019

PC1240 (A2/B2): PARTICLES AND WAVES – 3 (3-0-3) UT 90 Hours for 15 Weeks

INSTRUCTOR: Glenda Delos Reyes, Ph.D. **PHONE:** 780-539-2826
OFFICE: J220 **E-MAIL:** gdelosreyes@gprc.ab.ca

OFFICE HOURS: Monday 12:00 – 15:00 Tuesday 9:00 – 12:00

CALENDAR DESCRIPTION: Algebra-based course primarily for students in life, environmental, and medical sciences. It guides the students through two distinct types of motions: motion of matter (particles) and wave motion. Vectors, forces, bodies in equilibrium, review of kinematics and basic dynamics; conservation of momentum and energy; circular motion; vibrations; elastic waves in matter; sound; wave optics; black body radiation, photons, de Broglie waves. Examples relevant in environmental, life, and medical sciences will be emphasized.

PREREQUISITE(S)/COREQUISITE: Physics 20 or equivalent, Mathematics 30-1 or equivalent. Physics 30 is strongly recommended.

REQUIRED TEXT/RESOURCE MATERIALS: PHYSICS by Walker 5th Edition, Physics 1240 Lab Manual

DELIVERY MODE(S):

Lectures	A2/B2	MW	8:30-9:50	J202
Laboratory	A2	R	14:30 - 17:20	J103
	B2	F	14:30 - 17:20	J103

COURSE OBJECTIVES: This course is designed to be a survey course as an introduction to university level physics. In this course, students will learn about classical physics including Newton’s Laws, vectors, energy, momentum and rotational motion. Gravity and oscillatory motion will also be discussed. Sound and light waves will also be studied. The course concludes with a brief look at modern physics.

LEARNING OUTCOMES: Upon successful completion, a student is expected to have:

- Reasonable understanding of concepts of kinematics, vectors, Newton’s Laws, energy, rotational motion, oscillatory motion, superposition of waves, sound and electromagnetic waves.
- Experience with common mathematical and experimental tools, including problem solving for this course.

TRANSFERABILITY:

A list of institutions to which this course transfers (For example: UA, UC, UL, AU, GMU, CU, CUC, KUC. Please note that this is a sample and it must be replaced by your specific course transfer)

***Warning:** Although we strive to make the transferability information in this document up-to-date and accurate, **the student has the final responsibility for ensuring the transferability of this course to Alberta Colleges and Universities.** Please consult the Alberta Transfer Guide for more information. You may check to ensure the transferability of this course at Alberta Transfer Guide main page <http://www.transferalberta.ca> or, if you do not want to navigate through few links, at <http://alis.alberta.ca/ps/tsp/ta/tbi/onlineSearch.html?SearchMode=S&step=2>

**** Grade of D or D+ may not be acceptable for transfer to other post-secondary institutions. Students are cautioned that it is their responsibility to contact the receiving institutions to ensure transferability**

EVALUATIONS:

Assignments	10%
Midterm #1	15% October 9th
Midterm #2	15% November 13th
Labs	15% (Must pass Lab to pass course)
Final Exam	45% Cumulative. (Time and Location TBA by Registrar's Office)

Midterm Exams: Students are allowed a formula sheet (handwritten 8.5 x 11 inch both sides), a calculator (any calculator WITHOUT communication features) and pens or pencils and eraser.

Final Exam: This exam is cumulative. Students are allowed the same items as for a midterm exam. The final exam will be written during the exam period, between December 11 and December 20 inclusive (including Saturdays and evenings). Writing early is not permitted.

GRADING CRITERIA: (The following criteria may be changed to suite the particular course/instructor)

Please note that most universities will not accept your course for transfer credit **IF** your grade is **less than C-**.

Alpha Grade	4-point Equivalent	Percentage Guidelines	Alpha Grade	4-point Equivalent	Percentage Guidelines
A+	4.0	90-100	C+	2.3	67-69
A	4.0	85-89	C	2.0	63-66
A-	3.7	80-84	C-	1.7	60-62
B+	3.3	77-79	D+	1.3	55-59
B	3.0	73-76	D	1.0	50-54
B-	2.7	70-72	F	0.0	00-49

COURSE SCHEDULE/TENTATIVE TIMELINE:

NOTE: The course schedule is on Moodle and may be updated there if necessary. This schedule is preliminary but gives a good idea of which sections in the textbooks you should read to be caught up with the class lectures.

Date	Topic	Section in Walker
Sept 4	Introduction	1-1,1-2, 1-4
Sept 5/6	<i>No Lab (Lab orientation)</i>	
Sept 9	Dimensional Analysis	1-3, 1-6, 1-5, 1-8
Sept 11	Position, Velocity, Acceleration	1-7, 2-1, 2-2, 2-3, 2-4
Sept 12/13	<i>Lab 1– Graphical analysis</i>	
Sept 16	Kinematics Equations, Free Fall	2-5, 2-6, 2-7
Sept 18	Vectors	3-1, 3-2, 3-3, 3-4, 3-5
Sept 19/20	<i>Lab 2– Vector addition</i>	
Sept 23	Projectile motion	4-1, 4-2, 4-3, 4-4, 4-5
Sept 25	Newton’s Laws, Weight, Friction	5-1, 5-2, 5-3, 5-4, 5-5, 5-6, 5-7
Sept 26/27	<i>Lab 3-Acceleration due to gravity</i>	
Sept 30	Applying Newton’s Laws	6-1, 6-2, 6-3, 6-4, 6-5
Oct 2	Work, Kinetic and Potential Energy	7-1, 7-2, 7-3
Oct 3/4	<i>Lab 4- Non-Uniform motion</i>	
Oct 7	Problem Set #1	
Oct 9	Midterm #1	
Oct 10/11	<i>Lab 5-Atwood’s Pulley</i>	
Oct 16	Power, Applying Energy	7-4, 8-1, 8-2, 8-3, 8-4
Oct 17/18	<i>Lab 6-Potential Energy & Kinetic Energy</i>	
Oct 21	Impulse, Momentum, Collisions	9-1, 9-2, 9-3, 9-4, 9-5, 9-6, 9-7
Oct 23	Rotational Kinematics, Moment of Inertia	10-1, 10-2, 10-3, 10-4, 10-5, 10-6
Oct 24/25	<i>Lab 7-Collision of ball</i>	
Oct 28	Torque, Static Equilibrium	11-1, 11-2, 11-3, 11-4, 11-5
Oct 30	Angular Momentum, Rolling Motion	11-6, 11-7, 11-8
Oct 31	Gravity, Gravitational Potential Energy	12-1, 12-3, 12-4, 12-5
Nov 1	Simple Harmonic Motion, Damped & Driven	13-1, 13-2, 13-3, 13-7, 13-8
Nov 4	Mass on Spring, Pendulum	13-4, 13-5, 13-6
Nov 6	Problem Set #2	
Nov 13	Midterm #2	
Nov 14/15	<i>Lab 8-Standing Waves on a string</i>	
Nov 18	Waves	14-1, 14-2, 14-3
Nov 20	Sound Waves-Intensity and Standing waves	14-4, 14-5, 14-7, 14-8
Nov 21/22	<i>Lab 9- Speed of Sound</i>	
Nov 25	Light Interference	25-3, 28-1, 28-2, 28-3
Nov 27	Diffraction	28-4, 28-5, 28-6,

Nov 28/29	<i>Lab 10-Interference of Light</i>	
Dec 2	Black Body radiation, Photoelectric Effect	30-1, 30-2, 30-3, 30-4
Dec 4	de Broglie, Heisenberg, Tunneling	30-5, 30-6, 30-7
Dec 5/6	Problem Set #3	
Dec 9	Conclusion	

STUDENT RESPONSIBILITIES:

Assignments must be handed in on time, and tests/exams must be written on the days announced in class. If an emergency prevents a student from writing a test/exam on the scheduled day, the student must contact the instructor immediately to make other arrangements. Otherwise, the student will receive a zero grade for that component of the course.

For more information, refer to the College Policy on Student Rights and Responsibilities at <https://www.gprc.ab.ca/about/administration/policies/fetch.php?ID=69>

STATEMENT ON PLAGIARISM AND CHEATING:

Cheating and plagiarism will not be tolerated and there will be penalties. For a more precise definition of plagiarism and its consequences, refer to the Student Conduct section of the College Calendar at <http://www.gprc.ab.ca/programs/calendar/> or the College Policy on Student Misconduct: Plagiarism and Cheating at <https://www.gprc.ab.ca/about/administration/policies>

**Note: all Academic and Administrative policies are available on the same page.