

**UNIVERSITY OF CALGARY
DEPARTMENT OF PHYSICS AND ASTRONOMY
COURSE OUTLINE**

1. **COURSE: Physics 321 – Harmonic motion, waves, and rotation**

L01: MWF 9:00 – 9:50, ST 148, Dr. A. Louro, SB 623 403-220-8648, louro@ucalgary.ca, office hours: MWF according to the instructor’s calendar. A website for the course may be accessed by students on Blackboard.

PHAS main office: SB 605, 403-220-5385, office@phas.ucalgary.ca.

2. **PREREQUISITES:** Physics 211 or 217 or 221; Mathematics 211 or 213 or 221; and 253 or 263 or Applied Mathematics 219.

3. **GRADING:** The University policy on grading and related matters is described in sections F.1 and F.2 of the online University Calendar. In determining the final grade in the course, the following weights will be used:

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| • Paper assignments (best 5 of 6) – 25% | • Clicker questions – 3% | • Online assignments – 7% |
| | • Midterms (2) – 40% | • Final exam – 25% |

Percentage grades will be given for all elements of term work and examinations. A weighted course percentage will be calculated for each student after the final exam is written. A table of conversion from final course percentage to final course letter grade will be published on the course website later in the term.

4. **MISSED COMPONENTS OF TERM WORK:** The regulations of the Faculty of Science pertaining to this matter are found in the Faculty of Science area of the Calendar in section 3.6: <http://www.ucalgary.ca/pubs/calendar/current/sc-3-6.html>. It is the student’s responsibility to familiarize himself/herself with these regulations. See also <http://www.ucalgary.ca/pubs/calendar/current/e-3.html>.

5. **OUT-OF-CLASS-TIME ACTIVITIES:** Midterm 1: 2011-02-17 17:30–19:30. Midterm 2: 2011-03-24 17:30–19:30.

REGULARLY SCHEDULED CLASSES HAVE PRECEDENCE OVER ANY OUT-OF-CLASS-TIME ACTIVITY. If you have a clash with this out-of-class-time activity, please inform your instructor as soon as possible so that alternative arrangements may be made for you.

6. **TEXTBOOK:** Physics for Scientists and Engineers, Vol. 1, R. Knight, PearsonAddison–Wesley, 2nd. ed.

7. **EXAMINATION POLICY:** Calculators are allowed. Students are encouraged to read the Calendar, Section G, on Examinations: <http://www.ucalgary.ca/pubs/calendar/current/g.html>.

8. **OTHER IMPORTANT INFORMATION FOR STUDENTS:**

- (a) **ACADEMIC MISCONDUCT** (cheating, plagiarism, or any other form) is a very serious offence that will be dealt with rigorously in all cases. *A single offence may lead to disciplinary probation or suspension or expulsion.* The Faculty of Science follows a zero tolerance policy regarding dishonesty. Please read the sections of the University Calendar under K. Student Misconduct (<http://www.ucalgary.ca/pubs/calendar/current/k.html>) to inform yourself of definitions, processes and penalties.

- (b) **ASSEMBLY POINTS IN CASE OF EMERGENCY DURING CLASS TIME:** Be sure to familiarize yourself with the information at <http://www.ucalgary.ca/emergencyplan/assemblypoints>.
- (c) **ACADEMIC ACCOMMODATION POLICY:** Students with documentable disabilities are referred to the following links:
Calendar entry on students with disabilities: <http://www.ucalgary.ca/pubs/calendar/current/b-1.html>
Disability Resource Centre: <http://www.ucalgary.ca/drc/>
- (d) **SAFEWALK:** Campus Security will escort individuals day or night. Call 220-5333 for assistance. Use any campus phone, emergency phone or the yellow phones located at most parking lot pay booths.
- (e) **FREEDOM OF INFORMATION AND PRIVACY:** This course will be conducted in accordance with the Freedom of Information and Protection of Privacy Act (FOIPP). As one consequence, students should identify themselves on all written work by placing their name on the front page and their ID number on each subsequent page. See <http://www.ucalgary.ca/sec-retariat/privacy>.
- (f) **STUDENT UNION INFORMATION:**
VP Academic: Phone 220-3911, email suvpaca@ucalgary.ca.
SU Faculty Rep.: Phone 220-3913, email sciencerep@su.ucalgary.ca
website <http://www.su.ucalgary.ca/home/contact.html>.
Student Ombudsman: <http://www.su.ucalgary.ca/services/student-services/student-rights.html>.
- (g) **INTERNET AND ELECTRONIC COMMUNICATION DEVICE INFORMATION:**
You can assume that in all classes that you attend, your cell phone should be turned off. Also, communication with other individuals, via laptop computers, Blackberries, or other devices connectable to the Internet is not allowed in class time unless specifically permitted by the instructor. If you violate this policy you may be asked to leave the classroom. Repeated abuse may result in a charge of misconduct.

WEEK	TOPICS	READINGS IN KNIGHT	COMMENTS
1	Vector cross product. Rotational kinematics.	4.5-4.7, 12.10, 12.1	
2	Torque, moment of inertia, and kinetic energy of a single particle. Rigid body: Centre of mass, moments of inertia. Parallel-axis theorem.	Lecture notes on dynamics of a particle, 12.1-12.4.	
3	Rotational equilibrium. Rotational acceleration and Newton's 2nd. law for rotation.	12.5-12.8	
4	Rolling motion. Rotational kinetic energy and energy balance for rotating bodies. Angular momentum.	12.9-12.11	
5	Simple harmonic motion. Force and energy in SHM. Oscillators: A mass on a spring, a pendulum.	14.1-14.6	
6			Reading Week. No lectures.
7	Damped oscillation. Forced oscillations. Resonance.	14.7-14.8	Thursday: Midterm 1.
8	Waves: 1-D waves. Sinusoidal waves.	20.1-20.3	
9	Power transported by a wave. Waves in 2D and 3D. Sound and light. Power and intensity; the dB scale.	Lecture notes, 20.4-20.6	
10	Doppler effect. Superposition. Standing waves.	20.7, 21.1-21.2	
11	Transverse standing waves. Standing sound waves, musical acoustics. Interference.	21.3-21.8	Thursday: Midterm 2.
12	Fluids. Pressure. Hydrostatics. Buoyancy.	15.1-15.4	Good Friday.
13	Fluid dynamics. Equation of continuity. Bernoulli's equation.	15.5	
14	Review.		