



DEPARTMENT OF PHYSICS AND ASTRONOMY  
COURSE OUTLINE

1. **Course:** Physics 221, Mechanics

Lecture Sections:

L01: MWF 12:00-12:50 CHC105 Dr. David Feder SB535 dfeder@ucalgary.ca 220-3638 Office: W 14:30-16:00  
L02: MWF 16:00-16:50 CHC105 Dr. Jozef Biel biel@ucalgary.ca Office: W 13:00-14:30

Course Coordinator: Dr. Andrew Yau: SB 623 220-8825 yau@ucalgary.ca  
Course Website: <http://webapps3.ucalgary.ca/~dppvan/phys211-221/>  
D2L Course PHYS 211 L01-03/PHYS 221 L01-02 - (Fall 2014) – Mechanics  
Departmental Office: SB 605, 403-220-5385, phasugrd@ucalgary.ca

2. **Prerequisites:** A grade of 70% or higher in physics 30; 50% or higher in Mathematics 31; and 70% or higher in Pure Mathematics 30 or a grade of B– or above in Mathematics II (offered by Continuing Education)
3. **Grading:** The University policy on grading and related matters is described sections F.1 and F.2 of the online University Calendar. In determining the overall grade in the course the following weights will be used:

Assignments (12)	24%
Laboratory experiments (9)	18%
Diagnostic tests (2)	1%
Class Response Activity	2%
Midterm test	25% (October 17, 17:00-20:00)
Final Examination	30% (To be scheduled by the Registrar)

Students who receive a weighted mean mark <40% over the term test and the Final Examination should not expect to receive a course grade higher than “D”.

Percentage to letter grade conversion scale:

> = 95 %	A +	> = 75 %	B +	> = 60 %	C +	> = 48 %	D +
> = 85 %	A	> = 70 %	B	> = 55 %	C	> = 45 %	D
> = 80 %	A -	> = 65 %	B -	> = 50 %	C -	< 45 %	F

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. It is the student's responsibility to familiarize himself/herself with these regulations. See also Section E.6 of the University Calendar

5. **Scheduled out-of-class activities:**

Friday 10/17/2014, 17:00-20:00: Mid-term Test

**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. **Course Materials:** *R.D. Knight, Physics for Scientists and Engineers: A Strategic Approach, 3rd Edition, Addison-Wesley.*
7. **Examination Policy:** Closed book exam and mid-term test with formula sheet provided; calculator allowed; Students should also read the Calendar, Section G, on Examinations.
8. **Approved Mandatory and Optional Course Supplemental Fees:** None

9. **Writing across the curriculum statement:** In this course, the quality of the student's writing in laboratory reports will be a factor in the evaluation of those reports. See also Section E.2 of the University Calendar.
10. **Human studies statement:** Students in this course are not expected to participate as subjects or researchers. See also Section E.5 of the University Calendar.
11. **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 Section K. Student Misconduct 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 on assembly points.
  - (c) **Academic Accommodation Policy:** Students with documentable disabilities are referred to the following links: Calendar entry on students with disabilities and Student Accessibility Services.
  - (d) **Safewalk:** Campus Security will escort individuals day or night (<http://www.ucalgary.ca/security/safewalk/>). 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 is conducted in accordance with the Freedom of Information and Protection of Privacy Act (FOIPPA). 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. For more information see also
  - (f) <http://www.ucalgary.ca/secretariat/privacy>.
  - (g) **Student Union Information:** VP Academic Phone: 220-3911 Email: [suvpaca@ucalgary.ca](mailto:suvpaca@ucalgary.ca).  
SU Faculty Rep. Phone: 220-3913 Email: [sciencerep@su.ucalgary.ca](mailto:sciencerep@su.ucalgary.ca); Student Ombudsman
  - (h) **Internet and Electronic Device Information:** You can assume that in all classes that you attend, your cell phone should be turned off unless instructed otherwise. 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.
  - (i) At the University of Calgary, feedback provided by students through the Universal Student Ratings of Instruction (USRI) survey provides valuable information to help with evaluating instruction, enhancing learning and teaching, and selecting courses ([www.ucalgary.ca/usri](http://www.ucalgary.ca/usri)). Your responses make a difference - please participate in USRI Surveys.

### Lecture outline

- 1 Motion diagrams; Particle model; Position and Time; Velocity
- 2 Linear Acceleration; Motion in One Dimension; Solving Problems in Physics; Units and significant figures, Uniform motion; Instantaneous velocity
- 3 Finding position from velocity; Motion with constant acceleration; Free fall; Motion on an inclined plane; Instantaneous acceleration; Vectors; Properties of vectors; Coordinate systems and vector components
- 4 Vector algebra; Acceleration; Kinematics in two dimensions; Projectile Motion; Uniform circular motion
- 5 Uniform circular motion; Velocity and acceleration in uniform circular motion;
- 6 Non-uniform circular motion; Force; A short catalog of forces; Identifying forces; What do forces do; Newton's Second Law; Newton's First Law; Free-Body Diagrams; Equilibrium; Using Newton's Second Law
- 7 Mass, weight, and gravity; Friction; Drag; More examples of Newton's Second Law; Interacting Objects; Analyzing Interacting Objects
- 8 Newton's Third Law; Ropes and pulleys; Examples of interacting-object problems;
- 9 Dynamics in two dimensions; Uniform circular motion; Circular orbits; Non-uniform circular motion
- 10 Momentum and Impulse; Solving impulse and momentum problems; Conservation of momentum; Inelastic collisions; Explosions; Momentum in Two Dimensions
- 11 The basic energy model; Kinetic energy and gravitational potential energy; A closer look at gravitational potential energy; Restoring forces and Hooke's Law; Elastic potential energy;
- 12 Elastic collisions; Energy diagrams; Basic energy model revisited; Work and kinetic energy

- 13 Calculating and using work; Work done by a variable force; Work and potential energy; Thermal energy; Conservation of energy; Power

**Lab outline**

- 1 Units, equipment, motion diagrams
- 2 Measuring motion
- 3 Motion on the Inclined plane
- 4 Two-dimensional motion
- 5 Statics (Newton's 1st Law in 2D)
- 6 Newton's Second Law
- 7 Newton's Third Law
- 8 Collisions in One Dimension
- 9 Conservation of energy and Simple Harmonic Oscillators (SHO)

Department Approval \_\_\_\_\_ Date \_\_\_\_\_

Associate Dean's Approval for  
out of regular class-time activity: \_\_\_\_\_ Date: \_\_\_\_\_