

**PHYS 124A Introduction to Motion**

3 Credits, 3 hours lecture, 3 hours lab

This is an algebra based physics course directed at students in the life and medical sciences. It discusses two distinct types of motion: motion of particles and collective motion (waves). A review of kinematics and dynamics; conservation of momentum and energy; vector forces and bodies in equilibrium; elasticity and fracture; vibrations; circular motion; waves; sound and light; optics; topics in modern physics.

*Prerequisites and/or co-requisites*

MATH 30-1 and Physics 20-1 or equivalent.

**Instructor**

Jean-Pierre De Villiers

S211B

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**Office Hours**

Monday 14:00-14:50

Tuesday 11:00-11:50

Wednesday 13:00-14:50

Thursday 10:00-11:50

**Hours of Instruction**

Monday 12:00-12:50

Tuesday 08:00-08:50

Wednesday 09:00-11:50 (Lab)

Thursday 08:00-08:50

**Required Resources**

**Physics**, J. Walker. Pearson, 2015 (5th edition, with Mastering Physics)

Physics laboratory notebook

Lecture Notebook and separate bound notebook for assignments

**Course Outcomes**

Upon successful completion of the course, student will be able to:

- To understand at the conceptual and computational level two basic phenomena of the physical world: motion of material bodies (mechanics) and wave propagation. **(Comprehension)**
- To develop problem solving skills ranging from order-of-magnitude estimates to full algebraic/numeric solutions of multi-part verbal (word) problems in mechanics and wave propagation. **(Practical)**

- To develop basic laboratory skills: how to measure, quantify, and analyse physical phenomena; how to discuss and defend experimental results; how to communicate experimental results with your peers and your instructor. **(Practical)**

### Evaluation

|              |      |
|--------------|------|
| Assignments  | 10%  |
| Labs         | 20%  |
| Midterm Exam | 25%  |
| Final Exam   | 45%  |
| Total        | 100% |

*A grade of C- is required for progression or transfer.*

### Laboratory Work:

- Students must keep a proper record of experimental results in a hardcover physics laboratory manual (available at bookstore).
- Laboratory attendance is compulsory and no unexcused absences will be tolerated. An unexcused absence will result in a grade of zero for the missed lab and may result in course failure. See attendance policy.
- A properly formatted laboratory report produced using Microsoft Word and Excel is to be produced by the due date indicated by your instructor.
- Pre-lab: you are expected to arrive at a lab having read all advance material (posted on iLearn). A pre-lab exercise is due before the start of the lab period. If this exercise is not completed by the deadline, it must be completed during the lab period; the remaining time in the lab period will then be available for the experiment.
- A passing grade must be obtained in the lab portion of the course in order to pass the course. Specifically, students must achieve a 50% or greater aggregate score on lab reports in order to avoid an automatic grade of F. If a passing grade is obtained in the lab component, then a grade is assigned a grade based on term work using the weighting given below.

### Assignments & Tutorials

This course uses web-based assignments: you will need to use the Mastering Physics access kit purchased with your textbook to access the assignments; instructions will be provided in the first lecture. Assignments must be completed via the Mastering Physics web site before the posted due dates; partially completed assignments receive the score achieved before the due date.

- To help you develop your problem-solving skills and to deepen your understanding of the subject, lab periods on alternating weeks will be set aside for tutorials; these tutorials will consist of lecture review, a question and answer session, and a set of guided exercises
- You are expected to keep fully worked out solutions to your assignments in a bound notebook; your instructor may ask to see these solutions at any time, and you should be prepared to produce these solutions when demanded. The best approach is to have your solution book with you during lectures, and labs.
- You may rework assignments after the due date for practice purposes; this will have no effect on your score.

NOTE: missed or incomplete assignments may result in a grade of F for the course.

### Quizzes

You are expected to keep current with lecture materials by reviewing your notes, reading your textbook, and making effective use of office hours. To encourage this, there will be **periodic quizzes** consisting of simple conceptual questions. These quizzes may be done via Mastering Physics as part of the tutorial periods.

### Exams

There will be one midterm exam and a final exam in this course. The midterm exam takes place during the lab period in the week indicated above. The midterm will cover all topics covered up to the date of the exam. The two-hour final exam will take place during the exam period at the end of the term. The final exam is comprehensive. For all exams, you are expected to know fundamental relations and physical laws. No formula sheet will be supplied, although some hints may be given in some problems where a specialized identity or relation may be required. Only simple scientific calculators are allowed during examinations.

### Grading System

| Descriptor                         | Alpha Grade | 4.0 Scale | Percent   | Rubric for Letter Grades   |
|------------------------------------|-------------|-----------|-----------|--|
| Excellent                          | A+          | 4.0       | > 92.9    | Work shows in-depth and critical analysis, well developed ideas, creativity, excellent writing, clarity and proper format. |
|                                    | A           | 4.0       | 85 – 92.9 |  |
|                                    | A-          | 3.7       | 80 – 84.9 |  |
| Good                               | B+          | 3.3       | 77 – 79.9 | Work is generally of high quality, well developed, well written, has clarity, and uses proper format.                      |
|                                    | B           | 3.0       | 74 – 76.9 |  |
|                                    | B-          | 2.7       | 70 – 73.9 |  |
| Satisfactory<br><b>Progression</b> | C+          | 2.3       | 67 – 69.9 | Work has some developed ideas but needs more attention to clarity, style and formatting.                                   |
|                                    | C           | 2.0       | 64 – 66.9 |  |
|                                    | C-          | 1.7       | 60 – 63.9 |  |
| Poor<br><b>Minimum Pass</b>        | D+          | 1.3       | 55 – 59.9 | Work is completed in a general way with minimal support, or is poorly written or did not use proper format.                |
|                                    | D           | 1.0       | 50 – 54.9 |  |
| Failure                            | F           | 0.0       | < 50      | Responses fail to demonstrate appropriate understanding or are fundamentally incomplete.                                   |

**Proposed Schedule of Topics**

| Week | Chapter | Topic                              | Lab                       |
|------|---------|------------------------------------|---------------------------|
| 1    | 1       | Intro to Physics                   | Tutorial Period           |
| 2    | 2       | Units, 1D Motion                   | G1 - Intro to physics lab |
| 3    | 3, 4    | Vectors, Motion in 2D              | Tutorial Period           |
| 4    | 5       | Newton's Laws                      | M1 - Measuring g          |
| 5    | 6       | Newton's Laws                      | Tutorial Period           |
| 6    | 7       | Work and Energy                    | M3 - Friction             |
| 7    | 8       | Work and Energy                    | Midterm                   |
| 8    | 9       | Impulse and momentum               | Tutorial Period           |
| 9    | 10      | Rotational Kinematics              | M4 - Pulleys              |
| 10   | 11      | Rotational Dynamics                | Tutorial Period           |
| 11   | 13      | Simple Harmonic Motion             | W2 - SHM (pendulum)       |
| 12   | 14      | Sound Waves                        | Tutorial Period           |
| 13   | 26, 27  | Reflection and Refraction of Light | W4 - Thin Lenses          |
| 14   | 28      | Interference of light              | Tutorial Period           |

**Please Note:**

Date and time allotted to each topic is subject to change.

**Performance Requirements****Lecture Notes**

You are responsible for keeping a complete record of classroom work (lecture notes, interactive problems, classroom exercises) in a proper notebook.

**Student Responsibilities**

It is your responsibility as a student to contact the Office of the Registrar to complete the forms for Withdrawal or Change of Registration, and any other forms. Please refer to the list of important dates as noted in the Academic Schedule in the Keyano College credit calendar.

More specific details are found in the Student Rights and Student Code of Conduct section of the Keyano College credit calendar. It is the responsibility of each student to be aware of the guidelines outlined in the Student Rights and Student Code of Conduct Policies.

**Laboratory Safety**

In the science laboratories, safety is important.

Students must complete the *WHMIS for Students* online training course on Moodle before entering the science laboratories.

Students must comply with the mandatory laboratory safety rules for this course as provided in the laboratory manual. Failure to do so will result in progressive discipline such as a verbal warning, refused entry into the laboratory, or suspension from the College.

### **Student Attendance**

Class attendance is useful for two reasons. First, class attendance maximizes a students' learning experience. Second, attending class is a good way to keep informed of matters relating to the administration of the course (e.g., the timing of assignments and exams). Ultimately, you are responsible for your own learning and performance in this course.

It is the responsibility of each student to be prepared for all classes. Students who miss classes are responsible for the material covered in those classes and for ensuring that they are prepared for the next class, including the completion of any assignments and / or notes that may be due.

### **Academic Misconduct**

Students are considered to be responsible adults and should adhere to principles of intellectual integrity. Intellectual dishonesty may take many forms, such as:

- Plagiarism or the submission of another person's work as one's own
- The use of unauthorized aids in assignments or examinations (cheating)
- Collusion or the unauthorized collaboration with others in preparing work
- The deliberate misrepresentation of qualifications
- The willful distortion of results or data
- Substitution in an examination by another person
- Handing in the same unchanged work as submitted for another assignment
- Breach of confidentiality.

The consequences for academic misconduct range from a verbal reprimand to expulsion from the College. More specific descriptions and details are found in the Student Rights and Student Code of Conduct section of the Keyano College credit calendar. It is the responsibility of each student to be aware of the guidelines outlined in the Student Rights and Student Code of Conduct Policies.

In order to ensure your understanding of the concept of plagiarism, you must successfully complete the online tutorial found on [ilearn.keyano.ca](http://ilearn.keyano.ca). Then print the certificate, sign it, and show it to each of your instructors. Your course work will not be graded until you show this signed certificate.

## **Specialized Supports**

### **Counselling and Disability Services**

Counselling Services provides a wide range of specialized counselling services to prospective and registered students, including personal, career and academic counselling.

### **SKILL Centre**

The SKILL Centre is a learning space in the Clearwater Campus at Keyano College where students can gather to share ideas, collaborate on projects and get new perspectives on learning from our tutorial staff.

The SKILL Centre, through a variety of delivery methods, provides assistance in skill development to Keyano students. Assistance is provided by instructors, staff and student tutors. Individuals wishing to improve their mathematics, writing, grammar, study, or other skills, can take advantage of this unique service.

**Authorization**

This course outline has been reviewed and approved by the Program Chair.

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Jean-Pierre De Villiers, Instructor

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Louis Dingley, Chair

Date Authorized

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Guy Harmer, Dean

Date Authorized

**Signed copies to be delivered to:**

Instructor

Registrar's Office