

PHYS 124A Introduction to Motion*3 Credits, 3 hours lecture, 3 hours lab*

Algebra-based course primarily for students in life, environmental, and medical sciences. It guides the student through two distinct types of motion: 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.

Prerequisites and/or co-requisites: MATH 30-1 and Physics 20 or equivalent (PHYS 30 strongly recommended)

NOTE: Credit may be obtained for only one of PHYS 101, PHYS 102 or ENPHY 131 or University of Alberta's PHYS 108, PHYS 124 or PHYS 144.

Instructor

Jean-Pierre De Villiers
CC239

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Office Hours

M-F 13:00-15:00

Hours of Instruction

Monday 09:00 – 10:20
Wednesday 09:00 – 10:20
Thursday 14:00 – 16:50 (Lab)

Required Resources

- **Physics**, J. Walker. Pearson, 2017 (5th edition, with Mastering Physics)
- Physics laboratory notebook and Lab coat
- Lecture Notebook and separate bound notebook for assignments
- Laptop computer
- Staedtler 9 pc School Kit (ruler, protractor, compass, etc.)

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.

Lecture Notes

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

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.

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	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	
	Progression	C-	60 – 63.9	
Poor	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.
Minimum Pass	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	Main Topics	Lab/Tutorial	Additional Notes
1	2-1 to 2-7	1D Kinematics	Lab #1 (Introduction and Orientation)	Orientation
2	3-1 to 3-3, 3-5	2D Vector and Kinematics	Tutorial #1 (Chapters 1 to 2)	**Labour Day
3	4 to 6	Projectiles and Newton's laws	Lab #2 (Measuring gravity)	
4	7-1 to 7-3	Work/Kinetic energy	Tutorial #2 (Chapters 3 to 6)	
5	8-1 to 8-4	Potential energy and Energy conservation	Lab #3 (Friction)	
6	9-1 to 9-5	Momentum	Tutorial #3 (Chapters 7 to 9)	
7	10 to 11	Rotational motion	No lab period	**Thanksgiving
8	13-1 to 13-6	Simple harmonic motion (SMH)	Lab #4 (Pulleys)	
9	14-1 to 14-9	Sound	Tutorial #4 (Chapters 10 to 14)	
10	26-1 to 26-3, 26-5, 26-7	Geometric Optics	Lab #5 (SHM)	
11	28-1 to 28-2	Interference of Light	No lab period	**Remembrance **Reading break
12	28-3 to 28-4, 30-1	Interference and Quantum Physics: Blackbody	Lab #6 (Thin Lenses)	
13	30-2 to 30-3	Quantum physics: Einstein's Theory of Relativity, photons	Tutorial #5 (Chapters 26, 28 to 30)	
14	30-4 to 30-5	Quantum physics: Compton's effect and De-Broglie hypothesis	No lab period	

** College closed

Please Note:

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

Performance Requirements and Student Services**Student Responsibilities**

As a student, it is your responsibility to contact the Office of the Registrar to complete the required forms, including the Withdraw Course or Program or a Change of Registration form. Please refer to the important dates listed in the Academic Schedule in the [Keyano College credit calendar](#). The Keyano College credit calendar also has information about Student Rights and the Code of Conduct. It is the responsibility of each student to be aware of the guidelines outlined in the Student Rights and the Code of Conduct Policies.

Student Attendance

Class attendance is helpful for two reasons: First, class attendance maximizes a student's learning experience. Second, attending class is an excellent way to keep informed of matters relating to the course administration (e.g., the timing of assignments and exams). Ultimately, you are responsible for your learning and performance in this course. It is the responsibility of each student to be prepared for all classes. Absent students are responsible for the material covered in those classes, and students must ensure they are ready for their next class, including completing any missed assignments and notes.

Academic Misconduct

Students are considered responsible adults and should adhere to the principles of intellectual integrity. Intellectual dishonesty takes many forms:

- Plagiarism or the submission of another person's work as their 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,
- Submitting unchanged work for another assignment, and
- 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 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 Code of Conduct Policies. To ensure your understanding of plagiarism, you may be required to complete the online [Understanding Plagiarism tutorial](#) and submit the certificate of completion.

Online Learning

Technology and internet connectivity will impact your online learning experience. You may be required to watch online videos, take online quizzes, or participate in live online classes. Live/virtual courses will be hosted in Microsoft Teams or Zoom. For all course delivery types, you will access your course resources on Keyano's learning management system: Moodle (iLearn). Login in using your [Keyano username and password](#). Keyano College operates in a Windows-based environment and having access to the correct tools for online learning is essential. Here's a list of recommended system requirements.

Internet Speed

Minimum download and upload speeds of 10 Mbps. Recommended download speeds of 25 Mbps and upload speeds of 10 Mbps (if you are sharing your internet at home). You can check your internet speed with [Speedtest by Ookla](#).

Computer System Requirements

Microsoft Windows	Apple (Mac)
<p>Minimum Requirements:</p> <ol style="list-style-type: none"> 1. Windows 10 Operating System or above 2. 4GB of RAM 3. 10GB available hard drive storage space <ol style="list-style-type: none"> a. Install the Microsoft Office 365 suite (~3GB) * 4. Microphone, webcam, and speakers (All modern laptops have these three accessories built-in.) 5. Windows has built-in anti-virus/malware software. It is essential to install system updates to keep your device secured regularly. <p>*Microsoft Office 365 is free to Keyano students.</p>	<p>Minimum Requirements:</p> <ol style="list-style-type: none"> 1. Mac Operating System 10.14 (Monterey) or above 2. 4GB of RAM 3. 10GB available hard drive storage space <ol style="list-style-type: none"> a. Install the Microsoft Office 365 suite (~3GB) * 4. Microphone, webcam, and speakers (All modern laptops have these three accessories built-in.) 5. Mac has built-in anti-virus/malware software. It is important to install system updates to keep your device secured regularly. <p>*Microsoft office 365 is free to Keyano students.</p>

<p>Recommended Upgrades</p> <ul style="list-style-type: none"> • 8GB of RAM • Regularly back up or synchronize your files, locally or with a cloud-based storage option. <p>OneDrive is the cloud-based storage option free to students after the setup of KeyanoMail and Microsoft 365.</p>	<p>Recommended Upgrades</p> <ul style="list-style-type: none"> • 8GB of RAM • Regularly back up or synchronize your files locally or with a cloud-based storage option. <p>OneDrive is the cloud-based storage option free to students after the setup of KeyanoMail and Microsoft 365.</p>
<p>Tablets, iPads, and Chromebooks are not recommended: they may not be compatible with the testing lockdown browsers and Microsoft Office 365.</p>	

Specific Department Requirements

Business and OA programs require Windows 10. Other programs may utilize Windows-based tools as well.

Computer Software

Students have access to Microsoft Office 365 and Read&Write for free using Keyano credentials.

Recording of Lectures and Intellectual Property

Students may only record a lecture if explicit permission is provided by the instructor or Accessibility Services. Even if students have permission to record a lecture or lecture materials, students may not share, distribute, or publish any of the lectures or course materials; this includes any recordings, slides, instructor notes, etc., on any platform. Thus, no student is allowed to share, distribute, publish or sell course-related content without permission. It is important to recognize that the Canadian Copyright Act contains provisions for intellectual property. The [Academic Integrity Policy](#) provides additional information on Keyano College's expectations from students as members of the intellectual community.

ITS Helpdesk

If you have issues with your student account, you can contact the ITS Helpdesk by emailing its.helpdesk@keyano.ca or calling 780-791-4965.

COVID-19 We are subject to provincial, and municipal bylaws, and policies. These decisions may change pending further direction from the Alberta Chief Medical Officer, Alberta Health Services, and other provincial guidelines. To protect yourself and others, get immunized, wash your hands, wear a mask, keep your distance (2m/6 ft) and remain home when feeling unwell. For the most recent COVID-19 information, please refer to albertahealthservices.ca/COVID.

Specialized Supports The Student Services Department is committed to Keyano students and their academic success. There is a variety of student support available at Keyano. All student services are available during Keyano business hours: Monday to Friday, 8:30 a.m. to 4:30 p.m. The College is closed on statutory holidays. If you require support outside of regular business hours, please inform the support service team, and they will do their best to accommodate your needs.

Accessibility Services provides accommodations for students living with disabilities. Students with documented disabilities or who suspect a disability can meet with an Access Strategist to discuss their current learning barriers and possible accommodations. Students who have accessed accommodations in the past are encouraged to contact the department to request accommodations for the following semester. Please note that requesting accommodations is a process and requires time to arrange. Contact the department as soon

as you know you may require accommodations. For accessibility supports and disability-based funding, please book an appointment by emailing us at: accessibility.services@keyano.ca.

Accessibility Services also provides individual and group learning strategy instruction for all students and technology training and support to enhance learning. You can meet with an Access Strategist to learn studying and test-taking strategies. In addition, you can schedule an appointment with the Assistive Technology Specialist to explore technology tools for learning. Book an appointment today by emailing: accessibility.services@keyano.ca

Wellness Services offers a caring, inclusive, and respectful environment where students can access free group and individual support to meet academic and life challenges. Mental Health Coordinators provide a safe and confidential environment for you to seek help with personal concerns. Our Wellness Navigator offers support with basic needs such as housing, financial and nutritional support, and outside referrals when needed. Wellness Services welcomes students to participate in group sessions that address topics including mindfulness and test anxiety throughout the academic year. Individual appointments can be made by emailing wellness.services@keyano.ca.

Library Services: provides students with research, information, and education technology supports as they engage in their studies. Library staff are available to help you online and in person throughout the semester. Librarians offer individual and small group appointments booked using the online [Book A Librarian calendar](#). The Library also provides research and subject guides to help you with your studies. To view a subject or course-specific guide, check out the complete list of online [Subject Guides](#). To start your research and access citation guides (APA, MLA, Chicago, or IEEE), visit the [Research Help page](#). The Library's collections (including print and online materials) are searchable using [OneSearch](#). The Library offers a Loanable Technology collection to support students accessing and using technology. For an up-to-date list of technology available for borrowing, visit the Library's [Loanable Technology webpage](#). For a detailed list of library resources and services, go to www.keyano.ca/library. For all inquiries, please email askthelibrary@keyano.ca or [chat with us online](#).

Academic Success Centre: The Academic Success Centre at Keyano College (CC-119) provides **free** academic support services to registered students, such as tutoring, writing support, facilitated study groups, workshops, and study space. Academic Content Specialists are available in Mathematics, Science, Trades, Power Engineering, Upgrading/College Prep, Human Services, English, Humanities, and more. Students are encouraged to visit the Academic Success Centre to discuss study strategies and academic concerns. For additional information, please email Academic.Success@keyano.ca.

Academic Success Coach: The Academic Success Coach is located in the Academic Success Centre and works with students to develop academic success plans, time management skills, study strategies, and homework plans. For additional information, please email Academic.Success@keyano.ca.

Authorization

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

[First Name, Last Name], Instructor

[First Name, Last Name], Chair

Date Authorized

[First Name, Last Name], Dean

Date Authorized

Signed copies to be delivered to:

Instructor

Registrar's Office