

PHYS 126A - Fluids, Fields, and Radiation

3 Credits, 3 hours lecture, 3 hours lab

Physics 126 is a continuation of Physics 124. Fluid statics and dynamics, gases and kinetic interpretation; electrostatics; currents and circuits; magnetic field; electromagnetic induction; electromagnetic radiation (light) and its interaction with matter.

Prerequisites and/or co-requisites: PHYS 124

Instructors

Tamar Richards-Thomas
S209
(780) 7

Tamar.RichardsThomas@keyano.ca

Jean-Pierre De Villiers
CC 245 (Academics Office)
(780) 791-4832

Jean-Pierre.DeVilliers@keyano.ca

Office Hours

| | |
|-----------|---------------|
| Monday | 13:00 – 13:50 |
| Tuesday | 13:00 – 13:50 |
| Wednesday | 13:00 – 13:50 |
| Thursday | 13:00 – 13:50 |
| Friday | 13:00 – 13:50 |

Hours of Instruction

| | |
|-----------|-------------------|
| Monday | 15:00-15:50 |
| Wednesday | 15:00-15:50 |
| Tuesday | 14:00-16:50 (Lab) |
| Friday | 15:00-15:50 |

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 this course, the student shall 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 fluid mechanics and electricity and magnetism. **(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 | 2.5% |
| Tutorials | 7.5% |
| 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.

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.

Laboratory Work:

- Students must keep a proper record of experimental results in a hardcover physics laboratory manual (available at bookstore). **IF YOU DO NOT BRING YOUR LOGBOOK TO A LAB, YOU WILL BE EXCUSED FROM THE LAB.**
- 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 above.

Exams:

There will be one midterm exam and a final exam in this course. The midterm exam takes place during the last lecture in the week prior to Reading Week. 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 Progression | 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 Minimum Pass | 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

| Wk | Chapter | Main Topics | Lab/Tutorial |
|----|-----------|--|-------------------------------------|
| 1 | 15.1-15.4 | Fluids: Mass, pressure, density; Pascal's Principle; Archimedes' Principle; | Tutorial 1 - Review of Forces |
| 2 | 15.5-15.9 | Fluids: Bernoulli's Equation; viscosity | Archimedes' Principle |
| 3 | 19.1-19.3 | Electric forces: Electrostatics, Coulomb's Law | Tutorial 2 - Fluids |
| 4 | 19.4-19.7 | Electric forces: Electric field | Bernoulli's Equation |
| 5 | 20.1-20.6 | Electric potential: Potential energy, equipotentials, capacitance | Tutorial 3 - Electrostatics |
| 6 | 21.1-21.5 | Electric circuits: Resistance, Ohm's Law, Power, Alternating Current | Coulomb's Law |
| 7 | | Family Day; Reading break | |
| 8 | 21.6-21.8 | Electric circuits: Series and parallel Circuits; RC circuits | Tutorial 4 - Circuits |
| 9 | 22.1-22.3 | Magnetic fields; forces on a moving charge | Resistance |
| 10 | 22.4-22.7 | Magnetic forces: Currents in magnetic fields; fields from currents | Tutorial 5 - Inductance/Capacitance |
| 11 | 23.1-23.8 | Electromagnetic induction: Motional EMF, Flux, Faraday's Law | Magnetic fields |
| 12 | 24.1-24.6 | Alternating current circuits: Inductance, Reactance, resonance in LRC circuits | Tutorial 6- AC Circuits |
| 13 | 32.1-32.4 | Nuclear physics and radioactivity: Nuclear structure | e/m ratio of electron |
| 14 | 32.1-32.4 | Nuclear physics and radioactivity: Nuclear structure | Tutorial 7 - Nuclear and Lab exam |

Please Note:

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

Performance Requirements and Student Services

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](#). The Keyano College credit calendar also has information about Student Rights and Code of Conduct. It is the responsibility of each student to be aware of the guidelines outlined in the Student Rights and Code of Conduct Policies.

Student Attendance

Class attendance is useful for two reasons. First, class attendance maximizes a student's 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 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; 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.

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 may not be graded until you show this signed certificate.

Specialized Supports

The Student Services department is committed to Keyano students and their academic success. There are a variety of student supports available at Keyano College. Due to the continuing situation with the Covid-19 pandemic, the offered support services will be implemented differently this semester by being provided mostly virtually. In-person service can be requested as needed. All Alberta Health Services guidelines will be followed for in-person appointments—wear a mask, maintain two meters of physical distance, use hand sanitizer, and stay home if you are unwell.

All student services are available during Keyano business hours: Monday to Friday, 8h30-16h30.

Accessibility Services: provides accommodations for students with disabilities. Students with documented disabilities, or who suspect a disability, can meet with a Learning Strategist to discuss their current learning barriers and possible accommodations. Students who have accessed

accommodations in the past are encouraged to contact us to request them for the semester. Please note that requesting accommodations is a process and requires time to arrange. Contact us as soon as you know you may require accommodations. For accessibility services supports and to book a virtual appointment, please contact accessibility.services@keyano.ca.

Accessibility Services also provides individual and group learning strategy instruction for all students, as well as technology training and supports to enhance learning. Meet with a Learning Strategist to learn studying and test-taking strategies for online classes. 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 offer a safe and confidential environment to seek help with personal concerns. All individual appointments will continue virtually.

Wellness Services welcomes students to participate in any of the virtual group sessions offered throughout the academic year addressing topics including mindfulness and test anxiety.

Individual virtual appointments can be made by emailing wellness.services@keyano.ca.

Library Services: provides students with research and information supports as they engage in their studies. Library staff are available to support you both virtually and in person throughout the semester. For a detailed list of library supports and services, go to www.keyano.ca/library. For any inquiries, please email askthelibrary@keyano.ca.

Begin your research with the [Library's FIND page](#). Search for sources using OneSearch, the Library's Catalogue, or by searching in a specific database selected from the [A-Z Database List](#).

Individual support with the Information Librarian is available virtually. Appointments can be requested by using the [Book A Librarian online form](#).

Research and Subject Guides are helpful resources when beginning your research or addressing other information needs. To view a subject or course specific guide, go to the Subject Guide webpage [here](#).

To access additional research resources, including Citation Guides (APA, MLA, Chicago, or IEEE), go to the [Research Help Library page](#).

The Loanable Technology collection is available to support students in their online learning pursuits. Items available for borrowing include mobile projectors, webcams, noise cancelling headphones, Chromebooks, and laptops. For an up-to-date list of technology available for borrowing, go to the Library's [Loanable Technology webpage](#).

Skill Centre: Provides academic support services to students registered in credit programs at Keyano College in the form of tutoring, assignment/lab support, writing support groups, facilitated study groups, workshops, and study space. This service is free and is available for all Math, Sciences, Humanities and Trades courses offered at Keyano.

While most courses are being offered online, the Skill Centre will be offering mostly virtual services and in-person sessions as requested. Please email Skill@keyano.ca to get in contact with our Academic Content Specialists. The Skill Centre is located in CC-119 at the Clearwater Campus.

For the most up to date information on how to book a session, please view the [Keyano Skill Centre homepage](#).

Academic Success Coaching: offers you support and access to resources for your academic success to help you to find the Keys to your Success. The Academic Success Coach will work with you to develop an academic success plan, develop your study and time management skills, and connect you with the right resources here at Keyano. Academic.success@keyano.ca is the best way to access resources during virtual service delivery. The Academic Success Coach is located in the Skill Centre in CC-119 at the Clearwater Campus.

E-Learning

Technology and internet will impact your online learning experience. It's important that you are able to watch an online video and other course materials, take online quizzes, and participant in a live class with your instructor and other students.

Keyano College operates in a Windows based environment and having the correct tools for online learning is important. Here's a list of recommended system requirements.

Internet Speed

Minimum Internet speeds of 5 Mbps.
 Recommended Internet speeds of 25 Mbps (especially if you are sharing your internet at home).
 Check your internet speed with Fast.com.

System requirements:

| Microsoft Windows | Apple |
|---|--|
| <p>Minimum Requirements:</p> <ul style="list-style-type: none"> • A Windows 10 computer/laptop • Minimum 4GB of RAM. • 10GB+ available hard drive storage. • Enough available hard drive space to install the Microsoft Office suite (approximately 3GB). <u>Microsoft Office software is free to all Keyano students and employees.</u> • Microphone, webcam and speakers. A headset with a microphone is recommended. • System updates must be regularly installed. • Anti-Virus / Anti-Malware software | <p>Minimum Requirements:</p> <ul style="list-style-type: none"> • A Macintosh (V10.14 and above) computer/laptop • Minimum 4GB of RAM. • 10GB+ available hard drive storage. • Enough available hard drive space to install the Microsoft Office suite (approximately 3GB). <u>Microsoft Office software is free to all Keyano students and employees.</u> • Microphone, webcam and speakers. A headset with a microphone is recommended. • System updates must be regularly installed. • Anti-Virus / Anti-Malware software. |
| <p>Recommended Requirements</p> <ul style="list-style-type: none"> • 8GB of RAM • A method of backing up/synchronizing to local or cloud-based storage such as OneDrive is highly recommended. This is included if you complete the setup of KeyanoMail and download MS Office using your Keyano email for free. | <p>Recommended Requirements</p> <ul style="list-style-type: none"> • 8GB of RAM • A method of backing up/synchronizing to local or cloud-based storage such as OneDrive is highly recommended. This is included if you complete the setup of KeyanoMail and download MS Office using your Keyano email for free. |

Chromebooks are **not** recommended as they are not compatible with testing lockdown browsers.

A Microsoft Surface or iPad or iPad Pro may be possible alternatives in some program areas.

Specific Department Requirements:

Business and OA programs require Windows 10.

Other programs may utilize Windows based tools as well.

Computer Software

Students will be able to get access to Microsoft Office 365 for free using Keyano credentials by [clicking here](#).

Recording of Lectures and Intellectual Property

Students may only record a lecture if explicit permission is provided by the instructor or by 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 lecture 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 (instructor, or students) 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 are having issues with your student account, you can contact the ITS Helpdesk by emailing its.helpdesk@keyano.ca or calling 780-791-4965