

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

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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 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

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 and therefore 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.

Before entering the lab, students are responsible reviewing the lab manual and relevant Safety Data Sheets for the purpose of evaluating risks associated to health. Some hazards used in the laboratory may have additional risks to those with pre-existing medical conditions.

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. 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

The Student Academic Support Services (SASS) department: Accessibility Services, Skill Centre and Wellness Services, work together to support student success at Keyano College.

Accessibility Services (CC167) supports student success through group and individualized instruction of learning, study and test taking strategies, and adaptive technologies. Students with documented disabilities, or who suspect a disability, can meet with the Learning Strategists to discuss accommodation of the learning barriers that they may be experiencing. Students who have accessed accommodations in the past are encouraged to visit our office at their earliest opportunity to discuss the availability of accommodations in their current courses. Individual appointments can be made by calling 780-791-8934

Skill Centre (CC119) provides a learning space where students can gather to share ideas, collaborate on projects and get new perspectives on learning from our tutorial staff. Students visiting the centre have access to one-to-one or group tutoring, facilitated study groups, and assistance in academic writing. The Skill Centre's Peer Tutor program provides paid employment opportunities for students who have demonstrated academic success and want to share what they have learned. Tutoring is available free to any students registered at Keyano College on a drop in basis, from 9:00 am to 5:00 pm Monday through Friday. Additional evening hours are subject to tutor availability and are posted in the Skill Centre.

Wellness Services (CC260) 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. The Mindfulness Room in CC260 is available as a quiet space for students to relax during regular office hours. Wellness Service welcomes students to participate in any of the group sessions offered throughout the academic year addressing such topics as Mindfulness and Test Anxiety. Individual appointments can be made by calling 780-791-8934.

Please watch your Keyano email for workshop announcements from our Student Academic Support Services team.