

PHYS 126 - Fluids, Fields, and Radiation

3 Credits, 16 weeks, 3 hours lecture, 3 hours lab, 1 hour tutorial

Course Description

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

Instructor

Jean-Pierre De Villiers

S211B

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Office Hours

Monday	14:00-14:50
Tuesday	14:00-14:50
Wednesday	14:00-14:50
Thursday	09:00-09:50
Friday	13:00-13:50

Hours of Instruction

Monday	13:00-13:50
Tuesday	08:00-08:50
Wednesday	13:00-13:50
Thursday	14:00-15:50 (Lab)
Friday	08:00-08:50

Required Resources

Physics, J. Walker. Pearson, 2015 (4th edition, technology update, with Mastering Physics)

Physics laboratory notebook

Lecture Notebook and separate bound notebook for assignments

Course Outcomes

1. **Comprehension.** To understand at the conceptual and computational level two basic phenomena of the physical world: motion of fluids and charged particles.
2. **Practical.** 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.

3. **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.

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.

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;	
2	15.5-15.9	Fluids: Bernoulli's Equation; viscosity	Archimedes' Principle
3	19.1-19.3	Electric forces: Electrostatics, Coulomb's Law	Bernoulli's Equation
4	19.4-19.7	Electric forces: Electric field	Terminal velocity
5	20.1-20.6	Electric potential: Potential energy, equipotentials, capacitance	
6	21.1-21.5	Electric circuits: Resistance, Ohm's Law, Power, Alternating Current	Coulomb's Law
7		Family Day; Midterm Review; Midterm	
7	21.6-21.8	Electric circuits: Series and parallel Circuits; RC circuits	Potential and fields
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	Capacitance
11	23.1-23.8	Electromagnetic induction: Motional EMF, Flux, Faraday's Law	Inductance
12	24.1-24.6	Alternating current circuits: Inductance, Reactance, resonance in LRC circuits	Magnetic fields
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	Lab exam

Please Note:

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

Performance Requirements

iLearn and Lecture Notes

You are responsible for keeping a complete record of classroom work (lecture notes, interactive problems, classroom exercises) in a proper notebook. Lecture notes are posted to iLearn at the end of each week and do not constitute a complete record of lecture materials.

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.

Assignments

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.

- 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 or on paper.

Exams:

There will be one midterm exam and a final exam in this course. The midterm exam takes place during a 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.

Tutorials

- One hour per week will be used for tutorials.
- Tutorials are designed to help you develop your problem solving skills by having you work out a complete, written solution to a textbook problem or selected reading from your text under the guidance of your instructor
- Assessment of this component will be based on the quality and clarity of the written solution (getting the correct answer is not a significant component of the assessment).
- Tutorial assignments are due at the end of the tutorial period.
- **You are expected to work on tutorial problems by yourself, though you may discuss your work with your instructor or a classmate; collaborative solutions are not allowed unless explicitly stated by your instructor.**

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 2015-2016 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 the iLearn home page. 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.

Jean-Pierre De Villiers, Instructor

Louis Dingley, Chair

Date Authorized

Guy Harmer, Dean

Date Authorized

Signed copies to be delivered to:

Instructor

Registrar's Office