



Course Outline

University Studies

PHYS 1130A
Wave Motion, Optics, and Sound
Fall, 2014

3 CREDITS
3+3 HOURS PER WEEK
3.8 Engineering Units (for U. Alberta)

INSTRUCTOR: Jean-Pierre De Villiers

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OFFICE NUMBER: S211B

OFFICE HOURS:

Monday	02:00 – 02:50 PM
Tuesday	01:00 – 01:50 PM
Thursday	09:00 – 10:50 AM
Friday	10:00 – 10:50 AM

HOURS OF INSTRUCTION:

Monday	10:00 – 10:50 AM	Room 239
Wednesday	09:00 – 09:50 AM	Room 239
Thursday	02:00 – 04:50 PM	Room 239 (Lab)
Friday	12:00 – 12:50 PM	Room 239

COURSE DESCRIPTION:

Geometrical optics, optical instruments, oscillations, waves, sound, interference, diffraction, accompanied by related laboratory work.

PRE-REQUISITE(S):

Math 30 or Math 30 Pure, Math 31 and Physics 30 / MATH 100 or equivalent.

COURSE OUTCOMES:

- 1. Comprehension.** To understand at the conceptual and computational level two basic phenomena of the physical world: wave motion and light propagation.
- 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 mechanics and wave propagation.
- 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.

REQUIRED RESOURCES:

- **University Physics:** Young and Freedman. Addison Wesley, 2009 (13th edition) with Mastering Physics.
- Physics Laboratory Notebook
- Lecture Notebook and **separate bound notebook for assignments**

TOPICS TO BE COVERED:**Please Note:**

This course outline may be modified to facilitate unforeseen time constraints. Date and time allotted to each topic is subject to change.

Week	Chapter	Topic	Lab
1	1-8	Refresher: Calculus, Trig, Geometry, Vectors, Forces, Energy	
2	14	Oscillations and SHM	G1 - Intro to physics lab
3	14	Oscillations and SHM	
4	15	Waves - Basic	W2 - SHM (physical spring)
5	15	Waves - Superposition	
6	16	Sound	W6 - Oscillating Bracket
7	16	Midterm	
8	16	Sound Interference	W1 - Waves on a string
9	33	Light: Reflection and Refraction	
10	33/34	Images, Geometric Optics	W4 - Thin Lenses
11	34	Optics	
12	35	Interference	W5 - Diffraction and spectroscopy
13	35/36	Thin films, Diffraction	
14	36	Diffraction	Lab Exam

ILEARN

Go to <http://ilearn.keyano.ca>

This course is supported through iLearn. Assignments, readings and handouts will be posted on iLearn. Login information will be provided by your instructor. For further instructions please see the iLearn handout.

EVALUATION:

Component	Percentage	Due Date
Assignments	5%	Weekly, posted at www.masteringphysics.com
Labs	20%	See below for important conditions
Midterm	30%	Week of October 13, 2014
Final Examination	45%	Date TBA, in December

GRADING SYSTEM:

Letter Grade	Description	Grade Points
A+		4
A	Excellent	4
A-		3.7
B+		3.3
B	Good	3
B-		2.7
C+		2.3
C	Satisfactory	2
C-		1.7
D+		1.3
D	Minimal Pass	1
F	Failure	0

Students intending to transfer to other institutions require a 'C-' as a minimum grade. Transfer information on each course is available at the [Alberta Council on Admission and Transfers](#).

Students who do not complete all the required work should not expect to pass the course. Specifically, students must pass the lab component of the course (50% or greater aggregate score on lab reports) in order to receive a passing grade for the course. 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.

Students should consult:

<http://www.keyano.ca/Academics/Examinations>

IMPORTANT DATES:

October 10, 2014	Last day to withdraw with a refund (50%).
Week of October 13, 2014	Mid-term examination
November 26, 2014	Courses dropped after this date will be designated “W”. (A withdrawal (W) is not reflected in your GPA)
December 5, 2014	Last day of classes
December 8-17, 2014	Final Exams

COLLEGE POLICIES**Equality, Equity and Respect**

The Keyano College is committed to providing an environment of equality, equity and respect for all people within the College community. All members of this community are considered partners in developing teaching and learning contexts that are welcoming to all. Faculty, staff, and students are encouraged to use inclusive language to create a classroom atmosphere in which students' experiences and views are treated with equal respect and valued in relation to their gender, ethnic and cultural background, and sexual orientation.

Students should consult:

<http://www.keyano.ca/StudentLife/StudentConduct/IndividualRightsPolicy>

Plagiarism and Cheating

Every student expects to be treated and evaluated fairly in a course. Plagiarism and cheating robs everyone of this right.

No student may submit words, ideas or data of another student or person as his or her own in any writing, project, assignment, quiz, electronic presentation, exam etc. Any work used that is not the student's own must be clearly cited as belonging to someone else. There are penalties for using other's work and not citing it. The Student's Rights & Responsibilities document clearly outlines these penalties and the appeal process.

- No learner can obtain information from another student during an exam.
- No learner can bring unauthorized information (paper or electronic) into an exam or quiz.
- No student can submit work done in another course for grading in this course without the written prior approval of the course instructor.
- No student can submit copyright protected or commercially produced materials as part or all of an assignment without proper citation & permission.

Student Rights & Responsibilities

Students should consult the Keyano College Credit Calendar or online at:

<http://www.keyano.ca/Academics/CreditCalendar>

Specialized Supports and Duty to Accommodate*Disability Support Services: Learner Assistance Program*

If you have a documented disability or you think that you would benefit from some assistance from a Disabilities Counsellor, please call or visit the Disability Supports Office 780-792-5608 to book an appointment (across from the library). Services and accommodations are intended to assist you in your program of study, while maintaining the academic standards of Keyano College. We can be of assistance

to you in disclosing your disability to your instructor, providing accommodations, and supporting your overall success at Keyano College.

Specialized Supports and Duty to Accommodate

Specialized Support and Duty to Accommodate are aligned with the office of Disability Support Services: Learner Assistance Program (LAP) guided by federal and provincial human rights legislation, and defined by a number of Keyano College policies. Keyano College is obligated by legislation to provide disability-related accommodations to students with identified disabilities to the point of undue hardship.

COURSE-SPECIFIC POLICIES

Engineers are problem solvers. If you want to succeed in engineering it is important you learn how to organize your thoughts, to analyze, set up, and solve problems and to experience the often frustrating trials that arise in doing so. The best way to learn and retain knowledge is by practicing; the more problems you attempt and complete, the more experienced and confident you will become.

Engineering is a demanding profession: you must be able to clearly articulate solutions to complex problems in a timely manner. This course will encourage you to develop the work habits and skills necessary to submit clear and concise work on deadline. To reinforce this, keep in mind that sloppy work will **not** be graded in any component of this course, and late work will also **not** be accepted.

Teamwork is pervasive in engineering, but this is an activity that takes place among competent peers. Teamwork is a privilege that comes with competence. It is not a way to get by when you lack the skills to do the work yourself. In this course, working in groups can be helpful and is not discouraged, but you must be careful not to use teamwork to coast through an assignment or project; any work that you turn in must be your own (see rules on plagiarism below).

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 overheads are posted to iLearn at the end of each week and do not constitute a complete record of lecture materials.**

Attendance Policy

You are expected to attend all lectures, tutorials, and laboratories without exception. Failure to do so may jeopardize your standing in the course; please consult the Keyano College Calendar, also available on-line at <http://www.keyano.ca/Academics/CreditCalendar/>.

- Valid reasons for absences include illness, medical appointments, and family emergencies.
- You are expected to **notify your instructor** of your absence by **email** (preferred) or by **telephone** on or before the date of the absence; failure to do so will result in your absence being recorded as unexcused.
- You may be required to provide **written proof** justifying your absence at the instructor's discretion. Such proof will be required to obtain an excused absence from a quiz, tutorial, lab or exam.

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 due at the end of the lab session.
- **Pre-lab: you are expected to arrive at a lab having read all advance material (posted on iLearn). A prelab 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.
- **Laboratory safety** is a primary concern.
 - WHMIS certification is a prerequisite for participating in labs.
 - Any unsafe operation or abuse of laboratory equipment will result in expulsion from the lab and a grade of zero.
 - Serious safety breaches may be pursued as an academic matter.

Assignments, Quizzes, and Tutorials

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 anytime, and you should be prepared to produce these solutions when demanded. The best approach is to have your solution book with you during lectures, labs, and tutorials.**
- 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.**

Exams:

There will be one midterm exam and a final exam in this course. The midterm exam takes place during a lecture period in the week indicated above. The midterm will cover all topics covered up to the date of the exam. The three-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.

There will also be a laboratory exam in this course that will take place during the last week of lectures. This exam is a technical exam verifying your ability to carry out common analytical tasks: linearization and error analysis. The exam will take place in the last *lecture period* of the course.

Mentoring

All engineering students will be assigned a mentor (a faculty member). Brief meetings between student and mentor will take place at regular intervals, usually weekly, to help students manage the demands of the engineering program. Typical topics discussed with a mentor include study strategies, guidance, monitoring academic progress, among others.



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Jean-Pierre De Villiers, Instructor

Date

Reviewed and approved by:

Louis Dingley, Chair

Date

Guy Harmer, Dean

Date