Course
Syllabus for Phys 101

COURSE NAME	TERM/YEAR:
Introductory Physics: Oscillations and Waves	Fall 2020

OFFICE HOURS:
By appointment

CALENDAR DESCRIPTION:

Fluids, simple harmonic motion, traveling waves, standing waves, sound, light, interference of waves.

COURSE DESCRIPTION:

Introduction to hydrostatics and hydrodynamics. Simple Harmonic Motion, including energy conservation. Introduction to waves. Travelling and standing waves. Sound, including sound power and intensity. Doppler effect. Interference of waves in one, two and three dimensions. Young double-slit experiment.

COURSE PRE-REQUISITE(S):

Physics 11 and pre-calculus 12 (or equivalent).

LEARNING OUTCOMES:

- Understanding physical concepts taught in the course
- Making quantitative predictions using mathematical models of ideal fluids, ideal and damped oscillations, and waves in one, two and three dimensions
- Understanding principles and approximations used to create mathematical models of fluids, oscillations and waves

REQUIRED TEXTS & RESOURCES:

- Textbook: Knight, Physics for Scientists and Engineers 4e (e-text or printed edition). **See choices below.**
- Lecture notes (posted on Canvas on weekly basis).
- Worksheets (posted on Canvas on weekly basis). You will need a printer to print them, or you can just download them if you have digital pen and pad.
- Mastering physics access code. Purchase your code online via the UBC Bookstore as described below, then register at the Pearson website using the registration instructions posted on Canvas.

You should purchase your access code to homework and e-text online at **shop.bookstore.ubc.ca**. You can also buy the code directly at the Pearson website during the process of registration, but the price there will be higher. If you purchase your code online at **shop.bookstore.ubc.ca**, choose one of the two options:

1. ISBN **9780136780632** - 18-weeks access to MasteringPhysics **with Knight eText**: Price: CAD $69.99
2. ISBN **9780134067544** - 18-weeks access to MasteringPhysics **without Knight eText**: Price: CAD $49.99

Note that using the textbook is a course requirement, so if you choose option 2 (only homework access, no e-text), you will need to get a used textbook.

For the exams, you will need the following equipment:

- Laptop or desktop with a web camera and a microphone
- Room with stable internet connection in which you can stay alone
- Google Chrome with Proctorio Google Chrome extension

COURSE REQUIREMENTS:

All students are expected to complete assigned textbook reading, study posted lecture notes, complete provided worksheets and the homework assignments (on Mastering Physics).

GRADE DISTRIBUTION:

The grading scheme for the course is as follows:

	GRADE %
Homework Assignments (Mastering Physics)	30%
Midterm	30%
Final exam	40%

To pass the course, the students must obtain an overall grade of at least 50%.

COURSE POLICIES

It is the responsibility of every student to read and understand the College Policies. The College Policies on Academic Honesty, Academic and Exam Accommodations, Grading Practices, Student Conduct, Technology Usage, and more can be found here: http://corpuschristi.ca/about-us/academic-policies

In addition to the College Policies, this course also upholds the following policies and practices:

- There would be a midterm and a final exam. Working on the worksheets and completing the assignments through Mastering Physics are necessary steps for succeeding at the exams.

ACADEMIC INTEGRITY STATEMENT:

The exams will be held online and will be remotely invigilated by Proctorio. They will be open-book, which means that you can use all the course materials, textbook and your own notes. However, internet surfing, communicating with other people (in any form, including using the "homework help" services) will not be allowed. Each test will contain a pledge stating that you commit to follow the exam rules, and, if you take the test, these rules must be respected. At the end of each test, you will have to submit your exam notes. They do not need to be written neatly, but they should be legible and reflect the work you have done during the test.

We all are facing a challenge of transitioning all classes to the online format and making the assessment fair and transparent. An online exam environment is new to both instructors and students, and we are in search of reliable fair practices. I strongly believe that academic honesty is a norm. At the same time, I must be prepared for possible exceptions, since the students who follow the rules strictly in the future years will compete with the students who might not have taken the rules seriously, and I am committed to looking into possible academic integrity issues in case they arise.

ASSIGNMENTS:

To satisfy the requirements of this course, students will carry out the following assignments:

- Weekly textbook reading (in the amount of 3 to 5 textbook sections) and lecture slides review
- Weekly worksheets (not graded, but necessary to succeed at the exams)
- Weekly homework on Mastering Physics (graded)

LATE PAPERS:

If you happened to miss a deadline, I still want you to complete the homework. This is reflected in the late submission policy. You can submit the assignments even after the deadline, with a 5% penalty for each day of delay (not more than 30% penalty in total).

MISSED TESTS:

You are expected to write both exams. Please contact your instructor as soon as possible to arrange a make-up exam if you are unable to write the exam due to illness or an academic conflict.

COURSE SCHEDULE

Course Content and Anticipated Schedule

Part 1. Fluids
Part 2. Oscillations: Simple Harmonic Motion
Part 3. Waves

Week 1
Fluids. Pressure. Pressure in gases in liquids. (Ch 14.1-2)
Applications of hydrostatic pressure: Manometer, Barometer, Hydraulic lift (Ch 14.3)
Archimedes' Principle and Buoyancy (Ch 14.4)

Week 2
Fluid Dynamics: Continuity equation & Bernoulli Equation (Ch 14.5)
Simple Harmonic Motion (SHM) in 1D (Ch 15.1)
SHM & Cyclic motion (15.2)

Week 3
Energy in SHM (Ch 15.3)
Velocity and acceleration (Ch. 15.4)
Vertical Oscillations (Ch. 15.5)

Week 4
The Simple Pendulum (Ch 15.6)
Damped Oscillations (Ch 15.7)
Resonance (Ch 15.8)

========== midterm ==========

Week 5
Waves: Travelling Pulses and 1D Harmonic Waves. Longitudinal waves (Ch 16.1-3)
Velocity of a wave on a string (Eq.(16.34) from Ch. 16.4)
Sound & Light waves, index of refraction (Ch. 16.5)

Week 6
Sound: Power, Intensity, Sound level (Ch.16.8)
Doppler Effect (Ch 16.9)

Week 7
Superposition and Interference (Ch 17.1)
Standing Waves. Transmission and Reflection of Waves (Ch 17.2-3)
Closed-closed, open-open, open-closed geometry: Boundary conditions, examples (17.3-4)

Week 8
Interference in 1D (Ch.17.5-6)
Interference in 2D and in 3D (Ch.17.7)
Interference of Light. Young's Double-Slit Experiment (Ch 33.1-2)

========== final exam ==========