COURSE OUTLINE

PHYS 050
PRINCIPLES OF PHYSICS

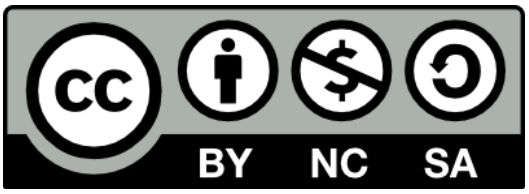
3 CREDITS

PREPARED BY: Tom McBee, Instructor
DATE: August 25, 2020

APPROVED BY:
DATE:

APPROVED BY SENATE: June 29, 2015
RENEWED BY SENATE:

DIVISION OF APPLIED ARTS
PHYS 050
Principle of Physics
3 Course Credits
Fall, 2020



PRINCIPLES OF PHYSICS

INSTRUCTOR: Tom McBee
OFFICE LOCATION: N/A
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TELEPHONE: 867.668.8831

OFFICE HOURS: TBA
CLASSROOM: Labs: A2801
Lectures: Online via Zoom
TIME: Labs: Fri. 1:00 -3:55 pm
Lectures: M/W/TH 2:30-3:30 pm
DATES: Sept.1st- Dec. 18th, 2020

COURSE DESCRIPTION

Physics 050 will allow students to take Physics 060 at Yukon University, a Grade 12 Physics course offered at high schools, or an algebra-based Physics course offered at colleges and universities. Physics 050 is suitable for those students wishing to enter vocational or career programs that require or will benefit from Grade 11 Physics. The content of the course includes: a review of mathematics for physics, kinematics, dynamics, vectors, momentum and conservation, energy, heat, and electricity as well as geometric optics.

PREREQUISITES

High school Mathematics 11 (Pre-Calculus from BC/Yukon or with Algebra elsewhere) or Yukon College Math 050 or any college equivalent is a co-requisite. It is strongly recommended that students complete Math 050, or high school algebraic mathematics grade 11, prior to enrolling in Physics 050. As there are many formal laboratory reports to write a demonstrated writing ability is also required. Successful completion of Yukon College English 030 (English 040 prior to 2016) would be considered the minimum

RELATED COURSE REQUIREMENTS

It is required that all students have access to a computer or other device and Internet to do their studies. The minimum specifications for a student device are as follows:

Requirement	**Windows-based PC**	**Apple Mac/macOS-based PC**
Operating System	Windows 10	macOS X
Web Browser	Firefox, Edge or Google Chrome	Firefox, Edge or Google Chrome
RAM/Memory	4 GB	4 GB
Storage	5 GB of available space	5 GB of available space

Safety classes are always required to be worn during the laboratories. Safety classes are provided, however, in the interest of comfort, students may wish to purchase their own. Students may also wish to purchase their own lab coat.

EQUIVALENCY OR TRANSFERABILITY

Yukon University Physics 050 is articulated as Advanced Physics in the Adult Basic Education system (ABE) in British Columbia and Yukon.
Yukon University Physics 050 is considered as an External Physics 11 credit by the British Columbia Ministry of Education. These courses are of equivalent or higher standard to other MEd-authorized senior secondary courses, but the learning outcomes differ.
Please refer to the BC Adult Basic Education Articulation Handbook.

LEARNING OUTCOMES

Upon successful completion of this course, students will be able to meet the learning outcomes for ABE Advanced level Physics located in the 2018-2019 BC Adult Basic Education Articulation Handbook which may be found at http://www.bctransferguide.ca/

- Obtain the prerequisite body of knowledge and skills that will provide a basis for further academic and career/vocational training
- Appreciate and apply the physics of everyday life

- Appreciate and apply the scientific method to investigations of all phenomena
- Communicate effectively, particularly to the scientific community using the language of physics and mathematics.
- Carry out all duties in an ethical, professional manner, including the collection of data.
- Work effectively as a member of a team.
- Handle equipment in a safe and effective manner with regard to their own safety and the safety of others.

COURSE FORMAT

Due to COVID, lectures will be conducted using ZOOM which is a synchronous (in real time) virtual format that enables face-to-face approaches to teaching and learning. Further, due to a reduction in class time, there are greater expectations students will work independently and do more homework. There are approximately 49 hours of class time in addition to 21 hours of laboratory time. The laboratories will generally be scheduled about every other week for three hours each.

ASSESSMENTS:

Attendance & Participation

The collection of data for most laboratories must be done in a laboratory, therefore students must attend or conduct a laboratory session in order to submit a report. Students arriving late to a laboratory session may be refused entry.

It is the student's responsibility to attend classes. Students who miss classes are responsible for any work missed except for laboratories as detailed in "ASSESSMENTS".

Assignments

Assignments account for 25% of the course mark.

Tests

There are two midterm examinations; each account for 25% of the course mark.

Laboratories

There are seven laboratories, each of which require a detailed report. Laboratories will be conducted in groups of 6 or less in Ayamdigut. Students outside of Whitehorse will be provided kits and perform laboratories very similar to those at Ayamdigut. Students in Whitehorse may obtain a kit and perform the laboratory at home by contacting the instructor and paying a deposit which will be refunded upon return of the kit and all its contents. The laboratories account for 25% of the course mark. ***Students must achieve a minimum of 50% on the laboratory component to pass the course**.

Electronic Devices

In order to be successful in classes and minimize distractions for others, cell phones, iPods and other electronic devices must be turned off while students are in class. In an emergency situation, the instructor may give a student permission to use a device.

Appropriate Language

In all areas of the university environment, students are responsible to show respect for others, swearing, or language that is discriminatory or derogatory in relation to race, sex, ethnic background, religious beliefs, age and physical condition is not appropriate.

EVALUATION:

Assignments	25%	
Laboratory mark*	25%	*See above
Midterm 1	25%	
Midterm 2	25%	
Total	100%	

Rewrites

A rewrite for a failing grade on an examination (less than 50%) may be permitted at the instructor's discretion. These examinations will be written no earlier than two weeks after the date of the original examination. The mark will be recorded whether it is higher or lower than the original. However, a maximum mark of 65% will be awarded.

"No Shows"

A student who misses an examination will receive a mark of zero for that examination but

may be permitted a rewrite. Exceptions may be made if a student receives prior permission from the instructor, or faces an emergency. Some form of documentation of the emergency may be required.

REQUIRED TEXTBOOKS AND MATERIAL

Open Stax, Rice University (2017). College Physics. Online.
Yukon University, Physics 050 Laboratory Manual, 2017.
Supplied. Scientific non-programmable calculator.

ACADEMIC AND STUDENT CONDUCT

Information on academic standing and student rights and responsibilities can be found in the current Academic Regulations that are posted on the Student Services/ Admissions & Registration web page.

PLAGIARISM

Plagiarism is a serious academic offence. Plagiarism occurs when a student submits work for credit that includes the words, ideas, or data of others, without citing the source from which the material is taken. Plagiarism can be the deliberate use of a whole piece of work, but more frequently it occurs when students fail to acknowledge and document sources from which they have taken material according to an accepted manuscript style (e.g., APA, CSE, MLA, etc.). Students may use sources which are public domain or licensed under Creative Commons; however, academic documentation standards must still be followed. Except with explicit permission of the instructor, resubmitting work which has previously received credit is also considered plagiarism. Students who plagiarize material for assignments will receive a mark of zero (F) on the assignment and may fail the course. Plagiarism may also result in dismissal from a program of study or the University.

YUKON FIRST NATIONS CORE COMPETENCY

Yukon University recognizes that a greater understanding and awareness of Yukon First Nations history, culture and journey towards self-determination will help to build positive relationships among all Yukon citizens. As a result, to graduate from ANY Yukon University

program, you will be required to achieve core competency in knowledge of Yukon First Nations. For details, please see www.yukonu.ca/yfnccr.

ACADEMIC ACCOMMODATION

Reasonable accommodations are available for students requiring an academic accommodation to fully participate in this class. These accommodations are available for students with a documented disability, chronic condition or any other grounds specified in section 8.0 of the Yukon University Academic Regulations (available on the Yukon University website). It is the student's responsibility to seek these accommodations. If a student requires an academic accommodation, he/she should contact the Learning Assistance Centre (LAC): lac@yukonu.ca.

TOPIC OUTLINE

Physics 050 covers the Core Topics as stated for ABE Advanced Level Physics located in the 2018-2019 BC Adult Basic Education Articulation Handbook which may be found at http://www.bctransferguide.ca/

More Specifically:

Measurement

- SI Units
- Dimensional Analysis
- Significant Digits
- Measurement
- Precision and Accuracy
- Graphical Analysis
- Creating Equations
- Solving Problems Using Equations

Kinematics

- Average and Instantaneous Velocities
- D-T and V- T Graphs
- Vectors and Scalars
- Relative Velocity
- Acceleration
- Average and Instantaneous Velocity

Dynamics

- Newton's First Law
- Newton's Second Law
- Newton's Third Law
- Gravity, mass, Weight
- Universal Law of Gravity

- The Normal Force
- Friction
- Elasticity: Springs, Stress and Strain

Momentum and Its Conservation

- Momentum and Impulse
- Conservation of Momentum

Energy and Work

- Work
- Power
- Work, Power, Force, and Energy
- Kinetic Energy
- Gravitational Potential Energy
- Conservation of Energy
- Efficiency

Thermal Energy

- Kinetic Molecular Theory
- Thermal Energy and Temperature
- Heat , Thermal Energy Transfer
- Specific Heat Capacity
- Law of Conservation of Energy
- Changes of State and Latent Heat
- Calorimetry

Electricity

- Electric Charge, Creation and Measurement
- Coulomb's Law
- Current
- Electric Circuits
- Electric Potential
- Resistance and Ohm's Law
- Simple Circuits
- Series Circuits
- Parallel Circuits
- Combined Series-Parallel Circuits
- Power
- Ammeters and Voltmeters

Waves

- Wave properties:
  - Wavelength, amplitude, period, frequency and velocity
  - Types of waves
- Electromagnetic waves:
  - Maxwell's equations
  - Production
  -
- The Electromagnetic Spectrum

Geometric Optics

- The law of reflection
- Plane mirrors
- Refraction

  - The law of refraction
  - Index of refraction and Snell's law
  - Apparent depth
  - Critical angle
  - Dispersion of white light
- Lens
  - Image formation by lens
  - Ray diagrams
  - The thin lens equation
- Mirrors
  - Image formation by mirrors
  - Ray diagrams
  - The thin lens equation for mirrors