



COURSE OUTLINE

PHYS 101

ELEMENTARY PHYSICS I

**45 HOURS
3 CREDITS**

PREPARED BY: Mark Shumelda

DATE: September 9, 2015

APPROVED BY: Margaret Dumkee

DATE: October 20, 2015

APPROVED BY ACADEMIC COUNCIL: (date)

RENEWED BY ACADEMIC COUNCIL: (date)



PHYS 101 Course Outline by Mark Shumelda is licensed under a [Creative Commons Attribution- NonCommercial-ShareAlike 4.0 International License](https://creativecommons.org/licenses/by-nc-sa/4.0/)

ELEMENTARY PHYSICS I

INSTRUCTOR: Mark Shumelda

OFFICE HOURS: Open-door policy
anytime, but to confirm my
availability email me beforehand

OFFICE LOCATION: A2208

CLASSROOM: A2603

E-MAIL: mshumelda@yukoncollege.yk.ca

TIME: Tues/Thurs 2:30pm-4:30pm
LAB: Wed 1:00pm-4:00pm

TELEPHONE: 668-8775

DATES: Sept. 9 - Dec. 18, 2015

COURSE DESCRIPTION

Physics 101 is a calculus-based first-year university level physics course intended for students planning on a career in the physical sciences or engineering. Topics covered are: vectors linear kinematics and dynamics in 2 and 3 dimensions; centre of mass; rotational kinematics and dynamics; energy and work; temperature, heat and the first law of thermodynamics; and oscillations. Labs involve quantitative physics experiments with due recognition of systematic and random errors.

Physics 101 followed by Physics 102 constitute a full course and satisfy requirements for 6 credits of first-year physics in the science degree programs at most Canadian universities.

PREREQUISITES

Physics 12 or Physics 060 or Physics 100

Math 100 is co-requisite.

RELATED COURSE REQUIREMENTS

Registration in PHYS 101L, the mandatory lab component of the course.

EQUIVALENCY OR TRANSFERABILITY

UBC	Phys 101 (3)	UAF	Phys 103X (3)
UNBC	Phys 100 (4)	UAS	Phys S103 (3)
UR	Phys 111 (3)	TRU	Phys 1100 (3)

SFU SFU PHYS 101 (3) - Q/B-Sci; YUKO PHYS 101 & YUKO PHYS 102 = SFU PHYS 101 (3) - Q/B-Sci & SFU PHYS 102 (3) - Q/B-Sci & SFU PHYS 130 (0) - Q
UVIC Phys 100L (1.5) or Phys 101+102 = Phys 112 (3)

See the website <http://bctransferguide.ca/> for a more complete list of transfers within British Columbia, including to university colleges.

On the strength of these transfer agreements the course will likely transfer to many other universities with which we do not maintain formal transfer agreements. For more information about transferability contact the Applied Science office.

LEARNING OUTCOMES

Upon successful completion of the course, students will:

- have an understanding of fundamental concepts of classical physics.
- have developed critical thinking skills.
- have developed basic laboratory skills.

COURSE FORMAT:

Lectures: Three hours per week.

Labs: Three hours per week.

Tutorials: One hour per week, incorporated into the lecture times.

Classes are a blend of lecture and tutorial allowing for an opportunity to practice solving calculation-based problems related to the material being covered in class.

Material will be posted on Moodle, including assignments, course announcements, suggested textbook problems, scans of instructor notes, and other useful or interesting material related to the course.

Labs are a mandatory component of the course. In order to receive a passing grade in the lab, a student must complete the experiments and submit the required reports. If a lab period is missed, the report for that experiment cannot be submitted unless arrangements are made with the instructor. Expectations for the labs are outlined in the lab manual.

ASSESSMENTS

Attendance & Participation

While attendance is not graded, regular attendance is necessary in order to succeed in any university-level course

Assignments

There will be at least 4 assignments due on an approximately bi-weekly basis. Assignments as a whole are worth 20% of the final grade, which is determined based on the total mark obtained on all assignments. Assignments will involve a number of questions or problems related to the course material. You will have at least one week to complete each assignment. Late assignments will be penalized 10% for each day late. Late assignments will not be accepted (receiving a mark of 0) once graded assignments have been returned to the class, which usually happens at the next class.

Tests

There will be two 60-minute term tests (October 6, 2015 and November 3, 2015) held during scheduled class time. Each test is worth 10% of the final grade. The final examination, worth 30% of the final grade, will take place during Final Exam period (Dec 7 - Dec 18). The exam date will be announced as soon as it is known.

Laboratory

As a whole, the laboratory component is worth 30% of the final grade. This will be based on lab performance (10%), and lab reports and exercises (90%) The specific

evaluation criteria for the lab are detailed in the lab manual.

EVALUATION

Assignments	20%
Midterm Exams (2)	20%
Lab	30%
Final Exam	30%
Total	100%

Students must get at least 50% in both the laboratory and the lecture component in order to pass the course.

REQUIRED TEXTBOOKS AND MATERIALS

Halliday D, Resnick R, Walker J. Fundamentals of Physics. 9th ed. Hoboken (NJ): John Wiley & Sons, Inc..

Laboratory Manual for Physics 101 (available for the first lab period)

ACADEMIC AND STUDENT CONDUCT

Information on academic standing and student rights and responsibilities can be found in the Academic Regulations:

http://www.yukoncollege.yk.ca//downloads/Yukon_College_Academic_Regulations_and_Procedures_-_August_2013_final_v1.pdf

PLAGIARISM

Plagiarism is a serious academic offence. Plagiarism occurs when students present the words of someone else as their own. Plagiarism can be the deliberate use of a whole piece of another person's writing, but more frequently it occurs when students fail to acknowledge and document sources from which they have taken material. Whenever the words, research or ideas of others are directly quoted or paraphrased, they must be documented according to an accepted manuscript style (e.g., APA, CSE, MLA, etc.). Resubmitting a paper 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 College.

YUKON FIRST NATIONS CORE COMPETENCY

Yukon College 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 College program, you will be required to achieve core competency in knowledge of Yukon First Nations. For details, please see www.yukoncollege.yk.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 College Academic Regulations (available on the Yukon College 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) at (867) 668-8785 or lassist@yukoncollege.yk.ca.

TOPIC OUTLINE

Week	Chapter	Topic
0.5	2	Motion along a straight line (review) - position and displacement - average and instantaneous velocity and acceleration - constant acceleration - free fall
1	3	Vectors - geometric addition

- addition by components and unit vectors

2	4	<p>Motion in two & three dimensions</p> <ul style="list-style-type: none"> - average and instantaneous velocity and acceleration - projectile motion - uniform circular motion - relative motion
3,4	5,6	<p>Force & motion</p> <ul style="list-style-type: none"> - Newtonian mechanics - Newton's laws - force, mass, acceleration - friction, drag forces, and terminal speed - uniform circular motion
5,6	7	<p>Kinetic energy & work</p> <ul style="list-style-type: none"> - kinetic energy and work - work done by gravitational force - work done by springs and other variable forces - power
7,8	8,18	<p>Potential energy & conservation of energy</p> <ul style="list-style-type: none"> - work and potential energy - conservative forces - conservation of mechanical energy - work done by an external force - conservation of energy
9	9	<p>Temperature, Heat, and the first law of thermodynamics</p> <ul style="list-style-type: none"> - zeroth law of thermodynamics - temperature and heat - heat and work - first law of thermodynamics <p>Centre of mass and linear momentum</p> <ul style="list-style-type: none"> - centre of mass - Newton's 2nd law for a system of particles - linear momentum - collision and impulse

- conservation of linear momentum
- inelastic and elastic collisions

10	10	<p>Rotation</p> <ul style="list-style-type: none"> - rotational variables - constant angular acceleration - kinetic energy and work - rotational inertia - torque - Newton's 2nd law for rotation
11	11	<p>Rolling, torque, and angular momentum</p> <ul style="list-style-type: none"> - rolling as translation and rotation combined - kinetic energy - forces - torque - angular momentum - Newton's 2nd law in angular form - angular momentum of a system of particles - angular momentum of rigid bodies - conservation of angular momentum - gyroscopes
12, 12.5	15	<p>Simple Harmonic Motion</p> <ul style="list-style-type: none"> - force law - energy in SHM - angular simple harmonic oscillator - pendulums - SHM and uniform circular motion

If time permits: Chapter 37 - Relativity.

**Specific dates of topic coverage may be subject to change. Some topics may not be covered depending on time constraints.*