Physics 12 Course Outline

Mr. J. Caudle @ VCSS, Spring 2019

Overview

Physics is the most fundamental natural science; it underlies and explains all the others. The findings of physics not only inform other fields but have led to many of the most impactful developments in human society. Electric power, flight, atomic weapons, microcomputing, steam power, metallurgy, space travel, wireless communication, navigation… no other field in science comes close in its influence on history or on our lives today.

To take Physics 12 you should have already completed Physics 11 and Pre-Calculus 11. You should have ***done well*** in those courses, as this course builds directly on their concepts and skills. Physics is generally a required course of study for post-secondary programs in science and engineering. You should look at the specific admission requirements for programs you are interested in applying to when deciding which courses you need to take.

Topic Timeline & Assessment

Time	Big Idea	Curricular Outcomes
2 weeks Jan-Feb	Motion in 2D can be resolved into independent x and y frames.	Vectors (B1) Kinematics (C1, C2)
1.5 weeks Feb	Newton's laws explain the relationship between force and motion in 2D.	Dynamics (D1, D2)
1 week Feb	Relationships between work, energy, and power can be used to solve problems.	Energy (E1) Gravitation (I1)
2 week Feb-Mar	Torque and translational force are balanced when in static equilibrium.	Momentum (F1, F2)
1 weeks Mar	Momentum is conserved in 2D.	Equilibrium (G1)
2 weeks Apr	A rotational reference frame can show uniform motion with unbalanced force.	Circular Motion (H1) Gravitation (I1)
2.5 weeks Apr	Electric fields arise from electric charges and cause potential energy and force.	Electrostatics (J1-J5)
2 weeks May	Ohm's and Kirchhoff's laws predict the behaviour and properties of circuits.	Electric Circuits (K1, K2)
2.5 weeks May	Magnetism and moving electric charge are co-dependent phenomena.	Electromagnetism (L1, L2)

Key Assessment Activities
Informal assessment: Observation during hands-on activities Discussion during tutorial support *Formative assessment:* Quizzes and practice tests Class discussions Activity (lab) reflections Simulations and demonstrations *Summative assessment:* Unit tests Formal lab reports Graphical analysis of data *Outcomes A1, A2 will be assessed across all units (experiments and graphical methods)

The "flipped" classroom model will be tried in the course and used throughout if it proves to be more supportive for student learning. In this model, content instruction (lecture, demonstrations, example problem solutions) is done at home through use of online-based resources. Students are expected to "watch the lesson" at home. In the classroom, students will have the full class period to practice and apply their learning, get teacher and peer support, as well as participate in formal and informal experiments and activities.

Assessment & Evaluation

Individual assessment tasks (a lab, a test) will be graded holistically, with reference to expected standards. For example, on a test: "work that meets expectations will demonstrate consistent accuracy with only occasional minor errors, resolve vectors into orthogonal components…". These assessments will be graded as meeting those expectations, approaching them, exceeding them, or not yet meeting them.

Separate grades will be kept for each of the "big ideas" of the course. Students who wish to demonstrate improved learning in a particular "big idea" will have the opportunity for reassessment, subject to some conditions.

An overall grade will be generated from these individual "big idea" grades. There will be a cumulative final exam in the course which will carry 30% of the weight of the final overall grade.

Student Expectations & Good Advice

To be a student in "good standing" in the course, you are expected to attend every class, on time, when possible. You should complete all assigned practice work and participate in class – asking questions and for help when you need it.

The top three things students who fail the course do:

3. Miss a lot of class, including by being late.
2. Not ask for help. When they are stuck, they struggle alone.
1. Not do the work. This is – by far – the number 1 grade killer.

Having good work habits is a necessity for success in senior academic courses, as well as in postsecondary studies. Being able to create a good work environment is important. For example, if watching a lecture video at home, you should turn off or remove other distractions (music, TV, phone) to give it your full attention.

The importance of completing assigned practice can not be stressed enough. If you feel you still need more practice after completing what is assigned, you are encouraged to seek out more – either online, or I can help provide too.

Materials + Resources

Each class you will need to bring your physics binder/folder, loose-leaf paper, pencil & eraser, and a calculator. You are expected to have internet access available at home in order to stream video (if class is "flipped") and access the class website. For lab experiments or informal physical projects, most materials will be provided at school, though sometimes readily available, inexpensive materials may be requested to be brought from home.

Contact & Information

My email address is james.caudle@yesnet.yk.ca

This is the email address to use for questions, feedback, or to send files. Please do not share Google Drive files with me at this address, as I can not access the corresponding Google account at this point in time.

My class website can be found at www.mrcaudle.com

There you can find regular postings of lessons and assigned work, as well as other resource documents, such as the Physics 12 curriculum document (which is hard to find, as this is the final year of use for the old curriculum.)