



Grand River Collegiate Institute

COURSE OUTLINE

For students and their families.

Course Name: Gr. 12 University Physics **Course Code:** SPH4UI
Curriculum Document: <http://www.edu.gov.on.ca/eng/curriculum/secondary/>

Prerequisite: SPH3UI

Teacher: Mr. Robert Emrich

Contact: 519-576-5100 ext. 6000

Textbook: Nelson Physics 12 (Replacement Cost: \$99.95)

COURSE DESCRIPTION

This course enables students to deepen their understanding of physics concepts and theories. We will continue to explore energy transformations and the forces that affect motion, and will investigate electrical, gravitational, and magnetic fields and electromagnetic radiation. We will also explore the wave nature of light, quantum mechanics, and special relativity. We will further develop our scientific investigation skills, learning, for example, how to analyse, qualitatively and quantitatively, data related to a variety of physics concepts and principles. We will also consider the impact of technological applications of physics on society and the environment.

Essential Learnings/Expectations/Skills

To be successful in this course you must be able to demonstrate all of the essential expectations as communicated by your teacher. These will be clearly communicated to you throughout the course.

Scientific Investigation Skills and Career Exploration

- Demonstrate scientific investigation skills (related to both inquiry and research) in the four areas of skills (initiating and planning, performing and recording, analysing and interpreting, and communicating);
- Identify and describe careers related to the fields of science under study, and describe the contributions of scientists, including Canadians, to those fields.

Dynamics

- Analyse technological devices that apply the principles of the dynamics of motion, and assess the technologies' social and environmental impact;
- Investigate, in qualitative and quantitative terms, forces involved in uniform circular motion and motion in a plane, and solve related problems;
- Demonstrate an understanding of the forces involved in uniform circular motion and motion in a plane.

Energy and Momentum

- Analyse, and propose ways to improve, technologies or procedures that apply principles related to energy and momentum, and assess the social and environmental impact of these technologies or procedures;
- Investigate, in qualitative and quantitative terms, through laboratory inquiry or computer simulation, the relationship between the laws of conservation of energy and conservation of momentum, and solve related problems;
- Demonstrate an understanding of work, energy, momentum, and the laws of conservation of energy and conservation of momentum, in one and two dimensions.

Gravitational, Electric and Magnetic Fields

- Analyse the operation of technologies that use gravitational, electric, or magnetic fields, and assess the technologies' social and environmental impact;
- Investigate, in qualitative and quantitative terms, gravitational, electric, and magnetic fields, and solve related problems;
- Demonstrate an understanding of the concepts, properties, principles, and laws related to gravitational, electric, and magnetic fields and their interactions with matter.

The Wave Nature of Light

- Analyse technologies that use the wave nature of light, and assess their impact on society and the environment;
- Investigate, in qualitative and quantitative terms, the properties of waves and light, and solve related problems;
- Demonstrate an understanding of the properties of waves and light in relation to diffraction, refraction, interference, and polarization.

Revolutions in Modern Physics: Quantum Mechanics & Special Relativity

- Analyse, with reference to quantum mechanics and relativity, how the introduction of new conceptual models and theories can influence and/or change scientific thought and lead to the development of new technologies;
- Investigate special relativity and quantum mechanics, and solve related problems;
- Demonstrate an understanding of the evidence that supports the basic concepts of quantum mechanics and Einstein's theory of special relativity.

EVALUATION

Evaluation Type

Quizzes (in-class and online)
Laboratory Reports
Tests
Assignments

Assessment Type

Formative
Formative & Summative
Summative
Summative

Determining the Final Grade

While formative assessments do not explicitly count towards the student's final grade, they are important and it is expected that all students complete the formative assessments. These formative assessments will be taking place throughout the course of the year and are used for a variety of purposes. Some of these include:

- to provide students with an opportunity to practice prior to being evaluated.
- to provide students with feedback from the teacher as to their progress.
- for the teacher to see the student's progress and determine next steps for the student.
- If an assessment is missed, formative assessments could be used, along with the teacher's professional judgement, to determine a final grade.

Evaluation Type

Term Work
Laboratory Reports & Assignments
Tests
Summative Assessments

Weight

70%
25%
45%
30%

PROCEDURES

Late and Missing Assignments:

It is important for students to develop good personal management skills (such as time management and planning). These skills will be reflected in the learning skills area of the report card. It is expected that students will complete and submit all essential tasks, as they are the opportunity for you to demonstrate your learning to your teacher.

Attendance:

Attendance in classes is an important part of learning, and absences should be avoided. When a student is absent, a parent/guardian must call the school's attendance line on the date of absence, or provide a note explaining the absence for the student to submit the following day. Students are responsible for what they missed during their absence.

Cheating and Plagiarism:

It is important for students to do their own best work. Most assignments for this class are done within the classroom, observed by the teacher, and this helps to minimize the chances of cheating and plagiarism. In the event that cheating or plagiarism occurs, the following consequences may be implemented, in consultation with administration, depending on the situation:

1. The student may be required to redo all or part of the assignment or assessment.
2. The student may be required to complete an alternate assignment or assessment.
3. The student's work may be treated as a missed assignment.

There may also be other consequences that are determined to be appropriate (e.g. detention, suspension, etc.) as per the school's progressive discipline process. Parents/guardians will be informed about the infraction and the consequences.

Please refer to the school website: <http://grc.wrdsb.ca/about/policies> for more details on these policies and other academic procedures.

Signatures

Please sign below indicating you have read and understand the requirements for successful completion of this course.

Student

Parent/Guardian