

Grade 12 Physics
University
SPH4U1 (credit value 1.0)

Prerequisite

SPH3U1

Course Description

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

Overall Expectations

Unit 1: 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.

Unit 2: ENERGY AND MOMENTUM

- analyze 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.

Unit 3: 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.

Unit 4: 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.

Unit 5: REVOLUTIONS IN MODERN PHYSICS

- 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 and understanding of the evidence that supports the basic concepts of quantum mechanics and Einstein's theory of special relativity.

Course Delivery

Expectations for the course will be addressed through various approaches, including those that emphasize experiential learning, cooperative learning and socratic learning.

Student Responsibilities

Attendance

Regular attendance is essential for success in this course. After an absence students are expected to show the teacher a parent note on the day of their return. Please review the school's attendance/absence policy.

Punctuality

On-time arrival is expected as a courtesy to the rest of the class. When a student arrives late, it disrupts the class. Late arrivals will be noted. If they occur regularly, the situation will be discussed with the student and if the situation cannot be remedied, it will be discussed with a parent/guardian and possibly a school administrator.

Completion of Work

Students are responsible for the completion of all work that is missed during an absence. Full credit will be given for this work if it is completed and shown to the teacher during the class following the student's return. It is the student's responsibility to find out what was missed, what was expected and to show the teacher the completed work.

A parent note which explains an absence must be presented to the teacher upon return to class in order to write a makeup test.

Homework

It is expected that homework will be completed regularly. It will be checked periodically and, on occasion, will be graded. If it has not been attempted it will receive a mark of zero.

Classroom Behaviour

Behaviour appropriate to a high school class is expected, including demonstration of respect to self, fellow students and the teacher. Laboratory equipment must be used appropriately.

Extra Help

Learning assistance is available. It is the student's responsibility to review work regularly and to decide when such help is needed. If specific problems cannot be solved in class, then students should make an appointment for extra help. These sessions are only helpful if students come prepared in advance.

Assessment and Evaluation

All work submitted in this course will be assessed and evaluated using the standards set by the Ontario Ministry of Education and the policy of assessment and evaluation as described at the end of this document.

Evaluation Categories/weighting

The evaluation of all achievement demonstrated in this course is based on the following categories and weighting:

Knowledge and Understanding.....17.5%

Subject-specific content acquired in each course knowledge), and the comprehension of its meaning and significance (understanding).

Thinking and Investigation.....17.5%

The use of critical and creative thinking skills and inquiry, research, and problem-solving skills and/or processes.

Communication.....14%

The conveying of meaning through various forms.

Application.....21%

Understanding connections among science, technology, society and environment.

Final Exam.....30%

In each of those categories, achievement will be evaluated as described below.

Level/ Grade	Achievement
Level 4 8 0-100%	Very high to outstanding level of achievement. Above provincial standards.
Level 3 70-79%	High level of achievement. At the provincial level.
Level 2 60-69%	Moderate level of achievement. Below, but approaching, the provincial standard
Level 1 50-59%	Passable level of achievement. Below the provincial standard
Below 50%	Insufficient achievement of curriculum expectations. Credit will not be granted.

Educational Resources

Physics 12: Nelson Education

Replacement Cost: \$85.

Bur Oak Secondary School Assessment, Evaluation and Communication Policy

Reporting Achievement

For Grades 9 to 12, a final grade is recorded for every course. A report card grade should reflect the student's most consistent level of achievement, with special consideration given to more recent evidence. To determine a report card grade involves the professional judgement and interpretation of evidence by teachers. The final grade will be determined with 70% of the grade based on evaluation throughout the course and 30% of the grade based on final evaluation at or towards the end of the course throughout the course.

Students are responsible for:	Staff are responsible for:	Parents/Guardians are responsible for:
<ul style="list-style-type: none"> • Completing a summative evaluation administered. • Attending all final evaluations (exams, course culminating etc). • Informing the school immediately if unable to attend due to illness, bereavement or court appearance. 	<ul style="list-style-type: none"> • In consultation with administration, provide a suitable method of evaluation. • Administering the final evaluation(s) no earlier than 3-4 weeks before the end of the course. • Providing feedback after examinations to support improvement of student learning. 	<ul style="list-style-type: none"> • Continuing to be active participants by working with the teacher, child and school to plan for the student's improvement. • Planning accordingly: booking vacations, appointments, etc., outside of the examination period.

Submission of Assessments and Evaluations

Students are responsible for providing evidence of their achievement of the overall expectations, both within the timeframe and format specified by the teacher. Please review the information below for details regarding the responsibilities of students, staff and parents with respect to specific assessment guidelines and policies.

Students, staff and parents/guardians are responsible for reviewing the full policy found on the school website/handbook.

Students are responsible for:	Staff are responsible for:	Parents/Guardians are responsible for:
Before an Assessment		
<ul style="list-style-type: none"> • Taking an active role in determining how they would like to demonstrate their learning. • In collaboration with the teacher, identify the learning goals and success criteria for assessments. • Planning for assignments to be completed in stages and to prepare ahead of time to receive feedback from the teacher about their progress. • Notifying their teacher of difficulty in submitting on time at least 48 hours in advance of the due date to discuss resolution strategies. • Accessing supports when necessary (peer-tutoring, extra help sessions, Special Education, student success) 	<ul style="list-style-type: none"> • Collaborating with students, clearly identifying learning goals and success criteria. • Applying a variety of tools to communicate requirements of in-class assessments to students and parents/guardians. • Providing a variety of types of assessments that allow students to demonstrate their learning in different ways. • Encouraging peer to peer support in the classroom. • Communicating with the parents/guardians. 	<ul style="list-style-type: none"> • Engaging their child to share what they are learning and what criteria will be used to assess their progress. • Remaining informed about the various tools that their child can access learning resources and materials from home (ie. Google Classroom, moodle). • Encouraging their child to share their work and explain how they are using the feedback in class to improve their learning and determine next steps. • Communicating with the teacher to learn about the student's progress throughout the semester (Parent Interviews, report cards, emails, calls).

During an Assessment		
<ul style="list-style-type: none"> • Seeking support and learning from their peers and/or teachers • Pursuing all learning opportunities (peer-editing, conferences, online feedback) leading up to a summative assessment. 	<ul style="list-style-type: none"> • Providing specific and timely feedback to help students succeed. • Maintaining timely and ongoing communication with students and/or parents about due dates and late assignments. • Referring students who regularly have difficulty in completing assignments on time to student services (Student Success, Special Ed, ELL etc). 	<ul style="list-style-type: none"> • Engaging their child to share what they are learning and what criteria will be used to assess their progress. • Communicating with the teacher • Ensuring students plan for major assignments to be completed in stages.
After an Assessment & Timely Submission		
<ul style="list-style-type: none"> • Submitting assessments/evaluations on the predetermined due date • Attending the day of an in-class assessment. • Understanding there are consequences if an assessment is missed or is submitted after the due date. • Reflecting on their learning and setting individual goals for future success 	<ul style="list-style-type: none"> • Ensuring late mark deductions on an assessment/evaluation will not result in a midterm or final percentage mark that misrepresents the student's actual achievement. • Possible assigning a zero for a final evaluation that is missed. • Recording submissions of late assessments/evaluations in the evaluation of the student's learning skills. 	<ul style="list-style-type: none"> • Understanding that there are consequences for not completing assignments for evaluation or for submitting those assignments late • Informing the teacher if there are extenuating circumstances inhibiting the submission of assessment on due date.

Late Assessments & Missing Assessments

In the scenario that student work is submitted late, teachers may keep the following in mind:

- Discuss with student and use professional judgment to address extenuating circumstances and the needs of the student.
- Special Education students and English Language Learners are entitled to extra time on all assessments and any decisions regarding deductions on late submissions for these students should be addressed with the SERT, the Student Success Team, or an administrator.
- If deducting late marks a teacher can deduct up to 3% per day to a maximum of 15%.
- **Please review the full policy found on the school website/handbook.**

Academic Honesty

Bur Oak students are expected to think independently and honestly. It is in the best interest of each student to build habits which contribute to genuine academic, personal and social growth. True learning in an intellectually stimulating environment is enhanced when students consistently demonstrate respect for the intellectual property rights of others. Whether intentional or through ignorance of the rules, acts of academic dishonesty can lead to severe consequences for students.

Instances of suspected cheating or plagiarism:

Students are responsible for:	Staff are responsible for:	Parents/Guardians are responsible for:
<ul style="list-style-type: none"> • Understanding there are consequences for submitting assessments that are plagiarized or with instances of cheating. • Demonstrating that the work is their own. 	<ul style="list-style-type: none"> • Dealing with incidences of cheating and/or plagiarism on a case-by-case basis. • In collaboration with administration will use professional judgement to use any of the following steps/consequences: <ul style="list-style-type: none"> ○ the teacher will interview the student regarding the incident; ○ parents or legal guardians will be contacted; the department head and administrator will be informed; ○ oral and/or written warning or reprimand; ○ a make-up assignment or rewrite may be given; ○ a deduction in marks, a failing grade or mark of zero may be assigned; and/or suspension. 	<ul style="list-style-type: none"> • Understanding there are consequences for submitting assessments that are plagiarized or with instances of cheating.

