INSTITUTE OF CANADIAN EDUCATION

Course Title: Physics, Grade 11, University Preparation (SPH3U)
Course Name: Physics
Course Code: SPH3U
Grade: 11
Course Type: University Preparation
Credit Value: 1.0
Prerequisite: SNC2D – Science, Grade 10, Academic
Curriculum Policy Document: *The Ontario Curriculum, Grades 11 and 12: Science (2008, Revised); Growing Success (2010)*
Course Developer: Institute of Canadian Education
Department: Science
Head of Department: Sadiya Manjra
Development Date: 2025
Most Recent Revision Date: 2026

This course develops students' understanding of the basic concepts of physics. Students will explore kinematics, with an emphasis on linear motion; different kinds of forces; energy transformations; the properties of mechanical waves and sound; and electricity and magnetism. They will enhance their scientific investigation skills as they test laws of physics. In addition, they will analyse the interrelationships between physics and technology, and consider the impact of technological applications of physics on society and the environment.

Prerequisite: SNC2D – Science, Grade 10, Academic

Course Expectations

Unit	Unit Title	Unit Titles and Descriptions	Time
1	**Kinematics**	Students investigate linear and two-dimensional motion, graphing, motion equations, acceleration due to gravity, and projectile motion using quantitative analysis and inquiry skills.	18 hrs
2	**Forces**	Students examine Newton's laws, free-body diagrams, friction, gravitational force, and applications of dynamics in technological contexts.	17 hrs
3	**Energy and Society**	Students explore work, kinetic and potential energy, conservation of energy, power, efficiency, thermal energy, nuclear energy, and sustainability issues.	18 hrs
	Midterm Exam		2 hrs
4	**Waves and Sound**	Students investigate mechanical waves, sound, resonance, standing waves, and the social and technological impact of sound and wave phenomena.	17 hrs
5	**Electricity and Magnetism**	Students examine circuits, Ohm's law, Kirchhoff's laws, magnetic fields, electromagnetic induction, motors, generators, and power transmission.	18 hrs
6	**Culminating Activity**	Students complete a culminating investigation and final examination demonstrating comprehensive achievement of overall course expectations.	17 hrs
7	**Final Exam**		3 hrs
Total Hours			110 hrs

Overall Curriculum Expectations:

A: Scientific Investigation Skills and Career Exploration

A1. 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)

B: Kinematics

B1. analyse technologies that apply concepts related to kinematics, and assess the technologies' social and environmental impact;

B2. investigate, in qualitative and quantitative terms, uniform and non-uniform linear motion, and solve related problems;

B3. demonstrate an understanding of uniform and non-uniform linear motion, in one and two dimensions.

C: Forces

C1. analyse and propose improvements to technologies that apply concepts related to dynamics and Newton's laws, and assess the technologies' social and environmental impact;

C2. investigate, in qualitative and quantitative terms, net force, acceleration, and mass, and solve related problems;

C3. demonstrate an understanding of the relationship between changes in velocity and unbalanced forces in one dimension.

D: Work & Energy and Society

D1. analyse technologies that apply principles of and concepts related to energy transformations, and assess the technologies' social and environmental impact;

D2. investigate energy transformations and the law of conservation of energy, and solve related problems;

D3. demonstrate an understanding of work, efficiency, power, gravitational potential energy, kinetic energy, nuclear energy, and thermal energy and its transfer (heat).

E: Waves & Sound

E1. analyse how mechanical waves and sound affect technology, structures, society, and the environment, and assess ways of reducing their negative effects;
E2. investigate, in qualitative and quantitative terms, the properties of mechanical waves and sound, and solve related problems;
E3. demonstrate an understanding of the properties of mechanical waves and sound and of the principles underlying their production, transmission, interaction, and reception.

F: Electricity & Magnetism

F1. analyse the social, economic, and environmental impact of electrical energy production and technologies related to electromagnetism, and propose ways to improve the sustainability of electrical energy production;
F2. investigate, in qualitative and quantitative terms, magnetic fields and electric circuits, and solve related problems;
F3. demonstrate an understanding of the properties of magnetic fields, the principles of current and electron flow, and the operation of selected technologies that use these properties and principles to produce and transmit electrical energy.

TEACHING AND LEARNING STRATEGIES

Presentations with Embedded Videos: Utilized to outline concepts, explain theory with examples and practice questions, and incorporate multimedia opportunities such as online simulations and quizzes.

End of Unit Conversations and Poodlls: Opportunities for students to express their ideas, problem solving, and thought processes with a teacher who provides timely feedback.

Reflection: An opportunity for students to look back at concepts and theories with new eyes, relate theory to practice, and align learning with their own values and beliefs.

Discussions with the Instructor: Facilitated through video conferencing to discuss concepts and skills, enabling two-way communication and helping build a relationship between student and instructor.

Instructor Demonstrations: Opportunities for the instructor to lead a student through a concept or skill (e.g. research skills) via video conferencing, videos, or email.

Discussion Forums: An opportunity for students to summarize and share ideas and perspectives with peers, deepening understanding through expression and enabling peer-to-peer feedback.

Practical Extension and Application of Knowledge: Integrated throughout the course to help students connect classroom learning to the world around them and their own lives, creating more meaning in their learning.

Individual Activities/Assignments: Completed at a student's own pace to expand and consolidate learning, with accommodation for IEPs and unique interests, and ongoing oral and written teacher feedback.

Research: An opportunity to apply inquiry skills to a practical problem or question, involving gathering information, evaluating sources, analyzing findings, and synthesizing conclusions through creative and critical thinking.

Writing as a Learning Tool: Helps students think critically about course material while organizing and integrating prior knowledge with new concepts, reinforcing communication skills.

Virtual Simulations: Interactive websites where students ask questions, explore hypotheses, and examine relationships between theory and application in a safe, curiosity-promoting environment.

Virtual Labs: Interactive websites where students follow a procedure to test hypotheses, gather and analyze observations, and formulate conclusions.

Diagrams: Visual representations of scientific ideas that organize concepts and promote cognitive plasticity, helping students remember and reframe ideas.

Graphics/Images: Visual representations of ideas/concepts that similarly promote cognitive plasticity.

Charts: Visual, math-based representations of scientific ideas that support analysis (e.g. a pie chart of Canada's energy sources).

Tables: Organize information into categories (rows and columns) to clarify relationships between ideas and data and highlight trends.

Drawings and Schematics: Visual explanations of scientific and engineering ideas (e.g. an electric circuit shown through symbols) that communicate ideas clearly and universally.

Articles: Examples of scientific concepts and theories discussed in relation to current events, showing how science is intertwined with society and diverse lived experiences.

Practice Problems: Provide a scenario or problem for students to solve by applying learned concepts and skills, reinforcing the relevance of their learning.

Assessment Strategies

Assessment practices can nurture students' sense of progress and competency and information instruction. Many diagnostic tools, e.g. checklists and inventories, are used at regular intervals throughout the units to encourage students' understanding of their current status as learners and to provide frequent and timely reviews of their progress. Teachers are encouraged to share goals with students early in the course and to connect Unit learning experiences frequently and explicitly with big ideas, overall expectations, and performance tasks. Students are also allowed a one-page (two sided) study sheet for the course. Teachers are recommended to encourage their students to create these sheets as a way of preparing for the tests.

Assessment FOR Learning	Assessment AS Learning	Assessment OF Learning
Practice (formative) worksheets	Oral presentations	Research projects
		Inquiry Assignments
		Tests & Exam

Evaluation

Final Grade

The final grade will be determined as follows (in accordance with Ministry of Education standards):

Term Work Based on evaluations conducted throughout the course.	65%

Summative Evaluation A final evaluation in the form of a written exam.	20%
Attendance and Participation	15%

Final Examination Breakdown

- 20% written exam

ATTENDANCE POLICY

Regular attendance and active engagement are important for student success. Attendance and participation are monitored through the school's Learning Management System (LMS).
All online credit courses at ICE are designed to meet or exceed the **minimum 110 hours of instructional time** required for a credit course.

Online instructional time and engagement are monitored through:

- **LMS Engagement:** Students are expected to log in regularly and actively participate in online learning activities. LMS activity records are used to monitor engagement.
- **Biweekly Check-Ins:** Students complete a brief check-in every two weeks to review their progress and engagement. Additional support may be provided when concerns are identified.
- **Post-Unit Quizzes:** Short formative quizzes are completed at the end of each unit to monitor student progress and pacing.
- **Discussion Forums:** Students participate in required unit discussions and peer activities. Participation is monitored based on completion and engagement.

Students are responsible for maintaining regular participation and completing required learning activities within the course schedule.

EVALUATION MODEL – 10% TOTAL ATTENDANCE AND ENGAGEMENT WEIGHT

Component	Weight	Quantifiable Metric	Criteria
Biweekly Check-In	3%	Completed every two weeks	Students completes the required check-in within the scheduled time frame.
Post-Unit Formative Quiz	4%	Completed after each unit	Student completes the formative quiz by the assigned deadline.
Discussion Forum Participation	3%	Required posts and responses	Student submits the required original response and completes assigned peer responses.

CONSIDERATION FOR PROGRAM PLANNING

PLANNING PROGRAMS FOR STUDENTS WITH SPECIAL EDUCATION NEEDS

OES teachers support all students, guided by the principles of *Learning for All* (2013). Where a student has an IEP, its accommodations are implemented within the course, and the asynchronous online structure naturally supports extended time, breaks, assistive technology, and repeated review of material.

PROGRAM CONSIDERATIONS FOR ENGLISH LANGUAGE LEARNERS

OES serves a linguistically diverse population of English language learners, both Canadian-born and newcomers, and follows Ministry ESL/ELD policy in planning appropriate adaptations. Supports include modified instructional language without altering curriculum expectations, visual/multimedia aids, extended time, and accommodations such as bilingual dictionaries.

ENVIRONMENTAL EDUCATION

Consistent with Ministry environmental education policy, environmental education is embedded across the curriculum rather than taught separately, and OES also models environmental responsibility through paperless delivery and no daily commuting. This course's STSE focus naturally incorporates topics like sustainability, resource use, and the environmental impact of human activity.

EQUITY AND INCLUSIVE EDUCATION

The course is planned and delivered in line with Ontario's Equity and Inclusive Education Strategy and PPM No. 119, aiming for an inclusive environment where all students feel welcomed and able to succeed regardless of background. Teachers select diverse learning materials, address bias, and ensure fair, culturally unbiased assessment.

FINANCIAL LITERACY EDUCATION

In accordance with Ministry financial literacy policy, students build the knowledge and skills to make informed financial decisions and think critically about economic forces affecting their lives. The course also incorporates cost-benefit analysis of technologies and the financial implications of health- and environment-related decisions.

FIRST NATIONS, MÉTIS, AND INUIT EDUCATION

Program planning aligns with the Ontario First Nation, Métis, and Inuit Education Policy Framework, incorporating Indigenous perspectives, authors, and content where appropriate to curriculum expectations. Students also gain opportunities to learn about Indigenous histories and contemporary realities, including the residential school legacy and the TRC's Calls to Action.

THE ROLE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY

ICT is integral to every aspect of OES courses, from instruction and assessment to teacher-student communication, all delivered through the school's learning management system. Teachers also help students develop digital citizenship skills, including responsible technology use, source evaluation, and academic integrity online.

CAREER EDUCATION

Consistent with *Creating Pathways to Success*, the course helps students explore who they are, their opportunities, and their goals, with many work-related and career-exploration activities embedded

throughout. OES guidance staff support course selection and postsecondary planning, and the course connects to pathways in health sciences, engineering, environmental science, research, technology, and skilled trades.

HEALTH AND SAFETY

Despite remote learning, OES prioritizes health and safety by promoting sound ergonomics, balanced screen time, and mental well-being, within a safe, respectful virtual environment with clear channels for reporting concerns. For hands-on, at-home investigations, students receive explicit safety instruction and use only safe materials under stated precautions, with virtual labs/simulations substituted where risk would otherwise be present.

Required Software, Equipment, and Resources

Required Resources

- Grade 11 Physics textbook aligned with Ontario curriculum
- Teacher-provided learning modules
- Digital simulations and lab resources

Digital Tools

- Google Workspace / Microsoft Office
- Graphing and simulation tools

Teacher Considerations

- Assistive technology as required
- Flexible demonstration formats
- Accommodations aligned with IEPs

Tips for Success

Welcome to **SPH3U: Physics!**

To succeed in this course:

- Check announcements and calendars regularly
- Complete assignments, labs, and quizzes on time
- Practise problem-solving and calculations consistently
- Ask questions early—especially before tests and major assessments
- Follow all laboratory safety procedures and guidelines
- Review teacher feedback and revise your work
  Plan **1–2 hours of focused study per day** for practice, review, and lab preparation

Staying organized and engaged will help you succeed and prepare you for postsecondary pathways in science, engineering, and technology.