Alexander College
YOUR ROAD TO UNIVERSITY STARTS HERE!

CURRICULUM GUIDE: OFFICIAL COURSE OUTLINE

Course Code	PHYS 153	Course Title	Electricity and Magnetism, Circuits, Radiation			
Credit Value	4	Department	Mathematics and Science			
No. of weeks	14	Hrs. per week	*Lecture*	*Tutorial*	*Laboratory*	*Total*
			3	0	3	6
Course Description	Introduction to electricity and magnetism, electric circuits, electromagnetic waves, and radioactivity, including applications. This course is calculus-based and intended for students of science and engineering. Students with credit for PHYS 102 or 142 may not take PHYS 153 for further credit.					
Prerequisite(s)	ENGL 099, PHYS 152, MATH 152 (MATH 152 may be taken concurrently)					

Initial Articulation Targets	*UBC*	*SFU*	*UVic*	*UNBC*	*TRU*
	PHYS 158 (3) & PHYS 159 (1)	ALEX PHYS 152 (4) + ALEX PHYS 153 (4) = SFU PHYS 121 (3) + SFU PHYS 132 (0) + PHYS 133 (1) + SFU PHYS 1XX (3)	ALEX PHYS 152 (4) + ALEX PHYS 153 (4) = UVIC PHYS 110 (1.5) + UVIC PHYS 111 (1.5) + UVIC 1XX (1.5)	PHYS 202 (4)	PHYS 1203 (3) & PHYS 1205 (0)
	For updated information on the transferability of this course, please consult the BC Transfer Guide, www.bctransferguide.ca				

Learning Outcomes

Upon successful completion of this course, the student will be able to:

- Draw free-body diagrams to determine the forces on an object. Forces include gravity, electric force, and magnetic force.
- Determine the electric and magnetic forces and fields from charge distributions that are fixed and moving using Maxwell's Equations: Gauss' Law, Faraday's law, and Ampere-Maxwell's Law.
- Solve circuits involving resistors, capacitors, and inductors using Kirchhoff's loop and junction rules.
- Relate Maxwell's equations to electromagnetic radiation.
- Explain the structure and properties of the nucleus.
- Explain alpha, beta, and gamma decays and determine the number of nuclei given the half-life.
- Set-up, record, and analyze data from experiments using uncertainty analysis and compare the results to theory.

Alexander College
Main Campus 4805 Kingsway, Burnaby, BC V5H 4T6
www.alexandercollege.ca

<table>
<tr><td>Content</td><td colspan="3">Core topics – all of the following will be covered:
Electrostatics: Coulomb’s Law, Gauss’ Law, Electric Potential
Magnetism: Ampere’s Law
Electromagnetic Induction: Faraday’s Law
Circuits: Resistors, Capacitors, Inductors
Electromagnetic Radiation
Nuclear physics
Radioactivity: Decay, Half-life
Labs cover the topics in this course.

Additional topics may also be covered, at the discretion of the instructor:
Ray optics
Law of reflection, Snell’s law
Lenses</td></tr>
<tr><td>Methods of Instruction</td><td colspan="3">Lectures, problem sessions, problem assignments, learning activities, assigned reading, quizzes and exams.</td></tr>
<tr><td>Required Textbook(s)</td><td colspan="3">The following textbook(s) is/are required, or approved equivalent(s).

Moebs, William et al. University Physics Volume 1, 2, 3. Houston, TX: OpenStax CNX, 2022.</td></tr>
<tr><td>Required Equipment and Technology</td><td colspan="3">Students are required to have a computer with internet access.
The following resources are provided by the College:
Office 365
Student email</td></tr>
<tr><td>Homework Hours</td><td colspan="3">At minimum, students can expect one hour of homework for every hour of instructional time.</td></tr>
<tr><td rowspan="5">Evaluation</td><td>Component</td><td colspan="2">% Value</td></tr>
<tr><td>Assignments, quizzes, presentations</td><td colspan="2">10-25%</td></tr>
<tr><td>Labs</td><td colspan="2">10-20%</td></tr>
<tr><td>Midterm examination(s) (1-2)</td><td colspan="2">20-40%</td></tr>
<tr><td>Final examination</td><td colspan="2">30-35%</td></tr>
<tr><td>Completion Requirements</td><td colspan="3">The minimum grade to pass this course is D (50%). Unless otherwise stated, a minimum grade of C- (55%) is required for this course to fulfil a prerequisite.</td></tr>
<tr><td>Course Designer(s)</td><td>Michael Wortis, Ph.D., Professor Emeritus, Department of Physics, Simon Fraser University</td><td>Consultant(s), if applicable</td><td>Dugan O'Neil, Ph.D., Department of Physics, Simon Fraser University, Kelly Cheung, Ph.D., (Coordinator) Physics Department, Alexander College, Michael Wortis, Professor Emeritus, Department of Physics, Simon Fraser University</td></tr>
<tr><td>Dean’s Approval</td><td>Barbara Moon, Ph.D. Dean of Arts and Sciences. Professor Emeritus,</td><td>Dean’s Approval Date</td><td>October 15, 2013</td></tr>
</table>

	Department of Biology, University of the Fraser Valley		
Curriculum Committee Approval Date	October 15, 2013	First Term Offered	Winter 2017
Last Review Date	March 1, 2023	Next Review Date	March 1, 2028
Revision History	March 1, 2023-Minor updates (e.g., assessment ranges, textbooks) by Kelly Cheung		