PHYS-080 – Physics, Advanced Level

College Preparation and Upgrading

Effective Term & Year: Fall 2026
Course Outline Review Date: 2031-03-01

Program Area: Upgrading for Academic and Career Entry

Description:

This course introduces students to physical laws governing motion, heat, electricity, and waves. Using verbal descriptions, geometry, algebra, graphs and vectors, students model the physical world and lend structure to common sense ideas about how the physical world behaves. Sophisticated data equipment in the physics laboratory gives students quick and easy access to data allowing them to develop models describing their environment.

Program Information:

This course is a prerequisite for PHYS 090 and may be used as preparation for entry into career programs.

Delivery Methods: On-campus (Face-to-Face), Directed/Guided Studies

Credit Type: ABE Credits

Credits: 0

Instructional Activity and Hours:

Activity	Hours
Classroom, Directed Studies or Online Instruction	60
Seminar/Tutorials	
Laboratory/Studio	30
Practicum/Field Experience	

Co-op/Work Experience	
Other	22.5 Guided Practice
Total	112.5

Course Requisites:

- Complete all of the following
  - Completed or concurrently enrolled in at least 1 of the following:
    - MATH080 – Mathematics – Advanced Level
    - PREC 11 – Pre-Calculus 11
    - FOM 11 – Foundations of Mathematics 11
    - MATH082 – Mathematics, Advanced Level (Developmental Mathematics)
  - Note: Pre-Calculus 11 or Math 080 is strongly recommended and is a prerequisite for Physics 090

Prior Learning and Recognition: No

Course Transfer Credit:

For information about receiving transfer credit for courses taken at either British Columbia or Alberta institutions, please see https://www.bctransferguide.ca/ or https://transferalberta.alberta.ca . For more transfer credit information, please visit https://www.cotr.bc.ca/Transfer

All requests for course transfer credit from institutions in British Columba or elsewhere should go to the College of the Rockies Enrolment Services office.

Textbook Resources:

Textbook selection varies by instructor and may change from year to year.

No specific textbook is currently required for this course.

Reference Website: www.physicsclassroom.com

Please see the instructor's syllabus or check COTR's online text calculator https://textbook.cotr.bc.ca/ for a complete list of the currently required textbooks.

Learning Outcomes:

Upon the successful completion of this course, students will be able to demonstrate competency in ABE Advanced Level Physics topics as stated in the 2023 – 2024 Articulation Handbook:

A) Measurement

- Solve problems involving SI units
- Maintain the correct number of significant numbers in calculations
- Use uncertainties in measurement
- Define vector and scalar quantities

B) Kinematics

- Use the language and concepts of kinematics to describe motion
- Analyze and solve kinematics in one dimension
- Construct and interpret displacement versus time curves
- Construct and interpret velocity versus time graphs
- Solve problems involving uniform acceleration

C) Dynamics

- Use the language and concepts of dynamics to describe forces and energy
- Analyze and solve dynamics in one dimension using free body diagrams
- Apply Newton’s laws of motion in one dimension
- Solve problems involving:
- Friction forces
- Gravity forces including Newton’s Law of Universal Gravitation
- Analyze and solve problems in kinetic and potential energy
- Analyze and solve problems in energy conservation
- Solve problems involving work and power
- Solve problems involving impulse and conservation of momentum in one dimension

D) Electricity

- Use the language and concepts of electricity to describe electrical phenomena
- Analyze and solve problems using Coulomb’s law
- Analyze and solve problems involving Ohm’s law
- Define and distinguish between electric potential difference, resistance and current
- Solve simple DC resistance problems involving series, parallel and combination circuits

E) Heat

- Use the language and concepts of thermodynamics to describe the transfer of heat energy
- Define and distinguish between temperature, heat energy and specific heat capacity

- Analyze and solve problems in heat energy
- Demonstrate an understanding of the different mechanisms of heat transfer

F) Waves

- Use the language and concepts of physics to describe wave phenomena
- Define and distinguish between amplitude, wavelength, frequency, wave speed and period
- Analyze and solve problems involving wave phenomena including refraction, reflection, and total internal reflection
- Describe various wave phenomena and the conditions which produce them

Laboratories:

Successful completion of one laboratory from each core topic and a minimum of seven laboratories are required. Laboratory skills must include:

- Collecting data through observation
    - Record a measurement to the appropriate level of precision
    - Recognize that all measured values have an uncertainty
- Constructing graphs
    - Choose appropriate scales
    - Determine line of best fit
    - Label correctly
- Drawing conclusions from observations and data
    - Identify and discuss sources of error
    - Calculate and interpret the slope of a line
    - Relate conclusion to objectives
- Calculating experimental error
    - Determine percent error and percent difference where appropriate
- Completing formal lab reports
- Participate in experimental design

See instructor’s syllabus for the detailed outline of weekly readings, activities and assignments.

Course Topics:

- Measurement – Science, Math and Measurement
- Kinematics – Linear Motion and Vectors
- Dynamics – Newton’s Laws, Momentum, Energy and Conservation, Circular Motion and Gravity
- Electricity
- Heat

- Waves

Evaluation and Assessments

Assessment Type: On-Campus (face-to-face)

Assessment Type	% of Total Grade
Assignments, Lab Activities, Quizzes	35%
Midterms	30%
Final Exam	35%
Total	100%

Assessment Type: Directed/Guided Studies

Assessment Type	% of Total Grade
Assignments, Lab Activities, Quizzes	35%
Midterms	30%
Final Exam	35%
Total	100%

Grade Scheme

A+	A	A-	B+	B	B-	C+	C	C-	D	F
>=95	94-90	89-85	84-80	79-75	74-70	69-65	64-60	59-55	54-50	<50

Evaluation Notes: A grade of “D” grants credit, but may not be sufficient as a prerequisite for sequential courses.

Evaluation Notes Comments:

Please see the instructor’s syllabus for specific classroom policies related to this course, such as details of evaluation, penalties for late assignments and use of electronic aids.

Exam Attendance:

Students must attend all scheduled exams at the appointed time and place. Instructors may approve an alternate exam to accommodate an illness or personal crisis. Department heads will consider other written requests. Any student who misses a scheduled exam without prior approval will receive a “0” on the exam.

Academic Policies:

College of the Rockies policies related to courses can be found at https://cotr.bc.ca/about-us/college-policies/ and include the following:

- Policy 2.1.4 Course Audit
- Policy 2.4.1 Credential Framework
- Policy 2.4.3 Students with Documented Disabilities
- Policy 2.4.4 Student Rights, Responsibilities and Conduct
- Policy 2.4.8 Academic Performance
- Policy 2.4.9 Student Feedback and Concerns
- Policy 2.4.11 Storage of Academic Works
- Policy 2.5.3 Student Appeal
- Policy 2.5.5 Prior Learning Assessment and Recognition (PLAR)

Course Changes:

The College of the Rockies updates course outlines regularly to meet changing educational, employment and marketing needs. The instructor will notify students in writing of any updates to this outline during the semester. The instructor reserves the right to revise, add or delete material while meeting the learning outcomes of this course outline.