PHYS-103 – Introduction to Physics 1

University Arts and Science

Effective Term & Year: Fall 2025
Course Outline Review Date: 2030-03-01

Program Area: Math and Sciences

Description:

Physic 103 is an introduction to classical mechanics: the study of motion and rotation using calculus as a tool. Students study kinematics, the modelling of three-dimensional motion using vectors; and then Newtonian dynamics, the effects of forces on an object. They are introduced to conservation laws: using energy and momentum to describe motion, and changes in motion. Finally, students study rotation: torque, moments of inertia, energy and the conservation of angular momentum.

Program Information:

This course is required for majors in Math, Physics, Engineering and Chemistry. It can be used as a lab science in the Associate of Arts and the Associate of Science degrees.

Delivery Methods: On-campus (Face-to-Face)

Credit Type: College of the Rockies Credits

Credits: 3

Course type/s: Lab Sciences, Sciences

Instructional Activity and Hours:

Activity	Hours
Classroom, Directed Studies or Online Instruction	45

Seminar/Tutorials	
Laboratory/Studio	45
Practicum/Field Experience	
Co-op/Work Experience	
Other	
Total	90

Course Requisites:

- Complete all of the following
  - Completed the following:
    - PHYS12 – Physics 12
    - PHYS090 – Physics – Provincial Level (3)
  - Completed or concurrently enrolled in:
    - MATH103 – Differential Calculus (3)

Prior Learning and Recognition: Yes

Students are able to request formal recognition of their prior learning or experience outside the classroom. Challenge examination, portfolio-assisted assessment, work-based assessment or a combination of assessments that is appropriate to identify, assess, and recognize prior skills, competencies, and knowledge to achieve course credit. Tuition fees apply, refer to Policy 2.5.5 Prior Learning Assessment and Recognition (PLAR) or contact an education advisor for more information.

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. At the Course Outline Effective Date the following textbooks were in use:

University Physics Volume 1 by Openstax,

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:

- use calculus to solve a variety of physical problems and derive equations describing different types of motion;
- use vectors to analyze and solve problems in kinematics, dynamics, work, torque, and angular momentum;
- recognize Newton's three laws and use them to derive and solve appropriate differential equations describing the motion;
- use Newton's laws to construct free body diagrams;
- use the conservation of energy to solve a variety of problems;
- recognize the concepts involved in rotational motion and use them to solve problems involving torque;
- use the concept of static equilibrium to construct free body diagrams and solve problems where forces and torques balance; and
- perform error analysis and calculate the uncertainty for measured values in a laboratory context.

Course Topics:

- Measurement
- Vectors
- Kinematics in one-, two-, and three-dimensions
- Dynamics: Newton's laws, friction, uniform circular motion
- Potential and kinetic energy, work, conservation of mechanical energy
- Centre of mass, linear momentum, conservation of momentum
- Angular momentum, torque, conservation of angular momentum
- Static equilibrium

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

Evaluation and Assessments

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

Assessment Type	% of Total Grade
Assignments	20%
Laboratory	20%
Midterms	30%
Final Exam	30%
Total	100%

Grade Scheme

A+	A	A-	B+	B	B-	C+	C	C-	D	F
>=90	89-85	84-80	79-76	75-72	71-68	67-64	63-60	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 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.