UNIVERSITY OF THE FRASER VALLEY

ORIGINAL COURSE IMPLEMENTATION DATE: September 1999
REVISED COURSE IMPLEMENTATION DATE: September 2026
COURSE TO BE REVIEWED (six years after UEC approval)**:** March 2032
Course outline form version: 29/08/2024

OFFICIAL UNDERGRADUATE COURSE OUTLINE FORM

Note: The University reserves the right to amend course outlines as needed without notice.

Course Code and Number: ENGR 113	**Number of Credits: 3** Course credit policy (105)
Course Full Title: Engineering Physics: Statics and Dynamics **Course Short Title:** Statics and Dynamics	
Faculty: Faculty of Applied and Technical Studies	**Department/School:** Physics

Calendar Description:

Emphasizes solution techniques and proper documentation for problems involving practical applications of Newton's laws to engineering situations.

Prerequisites (or NONE):	PHYS 111.
Corequisites (if applicable, or NONE):	None.
Pre/corequisites (if applicable, or NONE):	MATH 111.

Antirequisite Courses *(Cannot be taken for additional credit.)*

Former course code/number: **PHYS 113**

Cross-listed with:

Equivalent course(s):

(If offered in the previous five years, antirequisite course(s) will be included in the calendar description as a note that students with credit for the antirequisite course(s) cannot take this course for further credit.)

Typical Structure of Instructional Hours

Lecture/seminar	45
Tutorials/workshops	30
Total hours	**75**

Scheduled Laboratory Hours

Labs to be scheduled independent of lecture hours: **No**

Course Details

Special Topics course: **No**
(If yes, the course will be offered under different letter designations representing different topics.)

Directed Study course: **Yes; no limit on repeats**
(See policy 207 for more information.)

Grading System: **Letter grades**

Delivery Mode: **May be offered in multiple delivery modes**

Expected frequency: **Annually**

Maximum enrolment (for information only)**: 24**

Prior Learning Assessment and Recognition (PLAR)

PLAR is available for this course.

Yes

Transfer Credit *(See **bctransferguide.ca**.)*

Transfer credit already exists: **Yes**

Submit outline for (re)articulation: **Yes**
(If yes, fill in transfer credit form.)

Department approval	**Date of meeting:**	September 2025
Faculty Council approval	**Date of meeting:**	October 9, 2025
Undergraduate Education Committee (UEC) approval	**Date of meeting:**	March 27, 2026

Learning Outcomes *(These should contribute to students' ability to meet program outcomes and thus Institutional Learning Outcomes.)*

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

1. Create free body diagrams for single objects and structures
2. Use Newton's Laws to model and analyze practical situations in statics and dynamics
3. Choose from multiple co-ordinate systems to simplify the analysis
4. Use kinematics, energy, momentum or thermodynamics as appropriate for the solution of a situation
5. Document a solution in the standard format for engineering/industrial applications
6. Participate in the design and construction of group projects and subsequent presentation of the results.
7. Explain the importance of Engineers and Geoscientists BC guidelines for Indigenization and Reconciliation and how they apply to the professional practice of engineering.
8. Explain Engineers and Geoscientists BC programs and initiatives for Equity, Diversity, and Inclusion.

The learning outcomes are defined by the requirements for the Phys III component of the "First-Year Common Engineering Curriculum for the BC Post-Secondary Sector" which state the required course content, listed below in the Course Content section.

Recommended Evaluation Methods and Weighting *(Evaluation should align to learning outcomes.)*

Final exam:	40%	Quizzes/tests/midterm:	35%	Assignments:	15%
Project:	10%		%		%

Details:

NOTE: The following sections may vary by instructor. Please see course syllabus available from the instructor.

Typical Instructional Methods *(Guest lecturers, presentations, online instruction, field trips, etc.)*

The course will be presented using a combination of lectures and in class exercises. Additional problems will be assigned each week as homework.

Texts and Resource Materials *(Include online resources and Indigenous knowledge sources. Open Educational Resources (OER) should be included whenever possible. If more space is required, use the Supplemental Texts and Resource Materials form.)*

	Type	Author or description	Title and publication/access details	Year
1.	Textbook	Hibbeler, R.C.	Engineering Mechanics (Statics and Dynamics), 15th ed.	2021
2.	Textbook	Beer, F.; Johnston, E.R.; Mazurek, D.; Cornwell, P.	Vector Mechanics for Engineers, S.I. Metric Ed.	2015
3.	Textbook	Young and Freedman	University Physics, 15th ed.	2019

Required Additional Supplies and Materials *(Software, hardware, tools, specialized clothing, etc.)*

Engineering grade paper and simple drawing instruments.

Course Content and Topics

Lecture hours on each topic will follow provincially-mandated guidelines.

Topic	Chapters
Introduction to mechanics, fundamental concepts and principles, systems of units, solution methods and numerical accuracy; vectors	Hibb Ch1 1.1-1.6 Hibb Ch2 2.1-2.9
Newton's laws, forces as vectors, free body diagrams and equilibrium	Hibb Ch3 3.1-3.4
Rigid body equilibrium, torques as vector cross products, equivalent forces and couples; loadings and distributed forces	Hibb Ch4 4.1-4.10
Rigid body equilibrium in two and three dimensions	Hibb Ch5 5.1-5.7
Analysis of structures (trusses and frames)	Hibb Ch6 6.1-6.6
Internal forces	Hibb Ch7 7.1-7.3
Friction-wedges, square threaded screws, journal bearings, thrust bearings, and belt friction	Hibb Ch8 8.1-8.4
Particle kinematics – rectilinear and curvilinear motion (radial and tangential components)	Hibb Ch12 12.1-12.9
Newton's second law on dynamic systems	Hibb Ch13 13.1 13.6
Project: Spaghetti bridge	
Introduction to thermodynamics	Y&F Ch 17 17.1-17.7
Heat capacity; kinetic theory	Y&F Ch 18 18.1-18.6
Thermodynamic laws; heat engines	Y&F Ch 19 19.1-19.8 Y&F Ch 20 20.1-20.7