UNIVERSITY OF THE FRASER VALLEY

ORIGINAL COURSE IMPLEMENTATION DATE: September 1999
REVISED COURSE IMPLEMENTATION DATE: January 2021
COURSE TO BE REVIEWED (six years after UEC approval)**:** October 2026
Course outline form version: 05/18/2018

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:** 4 Course credit policy (105)

Course Full Title: Engineering Physics - Statics and Dynamics
Course Short Title: Statics and Dynamics
(Transcripts only display 30 characters. Departments may recommend a short title if one is needed. If left blank, one will be assigned.)

Faculty: Applied and Technical Studies	**Department (or program if no department):** Physics

Calendar Description:

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

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

Antirequisite Courses *(Cannot be taken for additional credit.)*
Former course code/number: **PHYS 113**
Cross-listed with:
Dual-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 hours	45
Tutorials/workshops	45
Supervised laboratory hours	
Experiential (field experience, practicum, internship, etc.)	
Supervised online activities	
Other contact hours:	
Total hours	**90**

Labs to be scheduled independent of lecture hours: ☐ No ☐ Yes

Special Topics *(Double-click on boxes to select.)*
This course is offered with different topics:
☒ No ☐ Yes *(If yes, topic will be recorded when offered.)*

Independent Study
If offered as an Independent Study course, this course may be repeated for further credit: *(If yes, topic will be recorded.)*
☒ No ☐ Yes, repeat(s) ☐ Yes, no limit

Transfer Credit
Transfer credit already exists: *(See **bctransferguide.ca**.)*
☐ No ☒ Yes
Submit outline for (re)articulation:
☐ No ☒ Yes *(If yes, fill in transfer credit form.)*

Grading System
☒ Letter Grades ☐ Credit/No Credit

Maximum enrolment (for information only): 36

Expected Frequency of Course Offerings:
Annually *(Every semester, Fall only, annually, etc.)*

Department / Program Head or Director: Norm Taylor	**Date approved:**	October 2019
Faculty Council approval	**Date approved:**	November 2019
Dean/Associate VP: John English	**Date approved:**	November 2019
Campus-Wide Consultation (CWC)	**Date of posting:**	February 21, 2021
Undergraduate Education Committee (UEC) approval	**Date of meeting:**	October 2, 2020

Learning Outcomes

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

- Accurately make free body diagrams for single objects and structures
- Use Newton's Laws to model and analyze practical situations in statics and dynamics
- Properly choose from multiple co-ordinate systems to simplify the analysis
- Use kinematics, energy, momentum or thermodynamics as appropriate for the solution of a situation
- Properly document a solution in the standard format for engineering/industrial applications
- Participate in the design and construction of group projects and subsequent presentation of the results.

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, which is listed below in the Course Content section.

Prior Learning Assessment and Recognition (PLAR)

☒ Yes ☐ No, PLAR cannot be awarded for this course because

Typical Instructional Methods *(Guest lecturers, presentations, online instruction, field trips, etc.; may vary at department's discretion.)*

The course will be presented using lectures, tutorials, and a project. Approximately seven problems per week will be handed in and marked. During the tutorial the marked assignments will be discussed, additional problems in the same general area will be dealt with, and help will be given for those needing it for the next assignment set. There will be a close coordination between the lecture topics and the tutorials. The project will be a spaghetti bridge competition (or something similar) based on the structural chapter covered.

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

Typical Text(s) and Resource Materials *(If more space is required, download Supplemental Texts and Resource Materials form.)*

	Author (surname, initials)	Title (article, book, journal, etc.)	Current ed.	Publisher	Year
1.	Hibbeler, R.C.	Engineering Mechanics (Statics and Dynamics), 14th ed.	☒	Pearson	2015
2.	Beer, F.; Johnston, E.R.; Mazurek D.; Cornwell, P.	Vector Mechanics for Engineers, S. I. Metric Ed.	☒	McGraw Hill	2015
3.	Young and Freedman	University Physics, 15th ed.	☒	Pearson	2019
4.			☐		

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

Engineering grade paper and simple drawing instruments.

Typical Evaluation Methods and Weighting

Final exam:	40%	Assignments:	15%	Field experience:	%	Portfolio:	%
Midterm exam:	25%	Project:	10%	Practicum:	%	Other:	%
Quizzes/tests:	10%	Lab work:	%	Shop work:	%	Total:	100%

Details (if necessary):

Typical 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 15 15.1-15.9
Heat capacity; kinetic theory	Y&F Ch 16 16.1-16.7
Thermodynamic laws; heat engines	