

SC/PHYS 1800 3.0 – Engineering Mechanics

Fall 2025

COURSE DIRECTOR

Professor Stan Jerzak, 233 PSE, e-mail: jerzak@yorku.ca,
Course website: <https://eClass.yorku.ca>

OFFICE HOURS

Tuesday	3:00 - 4:30 p.m.
Wednesday	11:00 – 12:00 a.m.
Friday	3:30 - 5:30 p.m.
or by appointment.	

SUBJECT MATTER

Fundamental concepts in classical mechanics with an emphasis on engineering applications will be covered.

COURSE LEARNING OUTCOMES

By the end of the course, students will be able to:

- Solve problems related to kinematics, including two-dimensional motions.
- Draw free-body force diagrams and use Newton's laws for objects under the actions of various forces.
- Use Newton's laws, torque and moment of inertia for extended objects in static equilibrium and when they rotate about an axis fixed in space.
- Solve problems related to work and energy, and the principle of conservation of energy.
- Solve problems related to the principle of conservation of momentum and angular momentum.
- Analyze oscillations of a spring-mass system and pendula.
- Understand the nature of mechanical traveling and standing waves, including sound.
- Use various devices to conduct experiments, analyze and report the collected data in a proper format.

PREREQUISITES/COREQUISITES

Prerequisites: 12U Physics or SC/PHYS 1510 3.00. MHF4U Advanced Functions and MCV4U Calculus and Vectors.

Corequisites: SC/MATH 1013 3.00 or SC/MATH 1300 3.00 or SC/MATH 1505 6.00.

Course Credit Exclusions: SC/PHYS 1010 6.0, SC/PHYS 1011 3.00, SC/PHYS 1410 6.0, SC/PHYS 1411 3.00.

LECTURE TIMES

Monday, Wednesday and Friday 2:30 – 3:30 p.m., LAS-A

TUTORIALS

Monday 4:30 p.m., LAS-A

TEXTBOOK:

Textbook (eBook) bundle includes:

- Physics for Scientists and Engineers 11th edition, Serway and Jewett
- WebAssign online homework system

The bundle can be ordered through York University bookstore's website.

Go to: https://www.bookstore.yorku.ca/buy_textbooks.asp
and select the course and the textbook (Ebook Webassign Bundle for PHYS 1800 and PHYS 1801, two term access). The cost of the bundle is (\$89.95 + HST).

2. Laboratory Manual - available on the eClass course website.

ASSIGNMENTS

Assignment problems will be marked using an online system called Enhanced WebAssign (EWA). In order to use WebAssign please go to the login page: <http://www.webassign.net/login.html> and click the **I have a Class Key** button.

The **Class Key** is: **yorku.ca 2825 1223**

You should type “yorku.ca” and two sets of four digits in three separate rectangular boxes.

The instructions how purchase and enroll in WebAssign are provide on eClass in the section called “Assignments”.

EVALUATION

The total mark will consist of:

Laboratory	18%
Assignments	7%
Two tests	$2 \times 20\% = 40\%$ (tests will be given in lectures on Mondays, October 6 and November 17).
Final exam	35% (2.5 hours long, during the exam period, December 4 - 19, 2025).

Students must pass both the lecture and lab components of the course.

The lowest test mark will be dropped and 20% transferred to the final exam (if the final exam mark is higher than the lowest test mark, the exam will be worth 55%).

Make-up tests will not be given. Students who miss a test due to an illness or other extenuating circumstances will be granted test exemption, that is, 20% for the test will be transferred to the final examination. Only one test exemption will be permitted (including the missed test due to medical reasons or other extenuating circumstances).

Lowest assignment mark (out of 9) will be dropped. This will include an assignment not completed due to medical reasons or other extenuating circumstances.

Last date to drop a course without receiving a grade – Nov. 4, 2025.

Course Withdrawal Period (withdraw from a course and receive a “W” on the transcript) – Nov. 5 - Dec. 2, 2025.

COURSE OUTLINE

Uncertainties and significant figures

Vectors

Motion along a straight line

Motion in two dimensions (projectile motion and circular motion)

Forces and Newton’s laws

Friction and drag force

Centripetal force

Work and energy

Linear momentum and collisions
Torque and Static Equilibrium
Moment of inertia, fixed-axis rotation and rolling motion
Angular momentum
Oscillations
Mechanical Waves

The list of paragraphs is posted on the eClass.

Any changes to the above course outline will be announced in lectures.

LAB INFORMATION

All labs related information is posted on eClass for labs (you have automatic access to it). If you have any questions regarding labs, please contact the lab Coordinator Professor Charles-Edouard Boukare (boukare@yorku.ca).

Outline of Student Rights and Responsibilities 2025 **Physics & Astronomy Dept., York University**

Academic accommodation for physical, medical, systemic, learning or psychiatric disabilities:

Students who feel that there are extenuating circumstances which may interfere with the successful completion of exams or other course requirements and students with physical, learning or psychiatric disabilities who require reasonable alternate accommodations in teaching style or evaluation methods should consult with the Counselling & Development Centre *AND* the Course Director *in the first week of the term* to make appropriate arrangements. Students have the right to have any accommodations they receive be treated confidentially. For further information, students should contact Counselling & Development Services: <http://cds.info.yorku.ca/> The Senate policy can be found here: <http://secretariat-policies.info.yorku.ca/policies/academic-accommodation-for-students-with-disabilities-policy/>

Academic Honesty:

The Senate of York University maintains a policy on Academic Honesty. "Academic honesty requires that persons do not falsely claim credit for the ideas, writing or other intellectual property of others, either by presenting such works as their own or through impersonation. Similarly, academic honesty requires that persons do not cheat..." Although collaboration with peers is an important component of the learning experience, "submitting work prepared in whole or in part by another person and representing that work as one's own" is a violation of academic honesty.

Evidence of violations of academic honesty are submitted to the Faculty of Science Associate Dean - Students for evaluation by the Dean and by the Committee on Examinations and Academic Standards. Penalties for confirmed violations of academic honesty can include lower grades, failure in the course, or expulsion from the University.

Students are advised to take the tutorial on Academic Honesty at http://www.yorku.ca/tutorial/academic_integrity/ and the Academic Integrity Quiz at http://www.yorku.ca/tutorial/yquiz/acad09_nologin/quiz/acad09_nologin.quiz to understand the underlying issues. A good overview is also available at http://www.yorku.ca/spark/academic_integrity/.

Non-Academic Student Conduct:

Non-Academic Student Conduct falls under the jurisdiction of the Code of Student Rights & Responsibilities: <http://www.yorku.ca/oscrr/studentconduct.html>. In particular:

"All students... are expected to conduct themselves in a way that promotes an atmosphere of civility,

diversity, equity and respect in their interactions with others.”

“[Students have] the right to participate in activities for students at the University, without harassment, intimidation, discrimination, disruption or acts of violence.”

Students must familiarize themselves with the underlying details surrounding their rights and responsibilities in the Code.