PHYS-1000H-A: Foundations of Physics
2022FA - Peterborough Campus

Instructor:

Instructor: Rayf Shiell

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Office: SC213

Office Hours: Tuesdays, 1 - 2 pm

Meeting Times:

Tuesdays 18:00-18:50, Wednesdays 10:00-11:50, Wenjack Lecture Theatre

Weekly two-hour workshops as listed on the Academic Timetable for your course section (numbered F01....F09).

Co-instructors and Teaching Assistants:

TBD

Department:

Academic Administrative Assistant: Colleen Berrigan

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Description:

An introduction to mechanics for students without high school physics experience. Designed for students seeking to strengthen their physics background in preparation for PHYS 1001H, or those who do not currently intend to pursue further studies in physics. Topics include kinematics (description of motion) and dynamics (causes of motion/forces/Newton's laws) in one and two dimensions. Concepts are extended to rotational motion, work and energy, momentum, and conservation laws. Time is taken to develop related mathematical skills. Not open to students enrolled in or with credit for PHYS 1001H or 1002H. Not for credit toward a major or minor in Physics.

It is expected that by the beginning of the course students will have if necessary refreshed their math skills from Grade 10 Academic level (denoted MPM2D in the Ontario school system). This includes being able to: sketch quadratic curves and solve quadratic equations algebraically; solve a system of two equations in two unknowns algebraically; and know how to apply the sine, cosine and tangent operations to triangles.

Learning Outcomes:

By the end of the course, a successful student should be able to:
1. understand fundamental principles underlying physical phenomena such as the motion of, and interactions between, particles
2. carefully and accurately describe these phenomena both verbally and mathematically.
3. apply and relate physics principles discussed within the course to everyday observations in the world around them
4. demonstrate analytical problem-solving skills and their applicability to a range of issues in daily life
5. employ a variety of quantitative and qualitative data analysis and visualization tools, such as vector diagrams, free-body diagrams, and graphs
6. demonstrate an understanding of the boundaries of their own physics knowledge, and effective strategies for expanding those boundaries with further self-study
7. appreciate key principles of science and the scientific method, and recognize how understanding the motion of, and interactions between, objects in nature has stemmed from this.

Texts:

(Required) We shall work through the first eight chapters from *College Physics, 2nd Ed*, by Urone & Hinrichs (senior authors), published by OpenStax (Rice University).

A physical coursepack containing these chapters (preferred) is available from the bookstore, which allows physical annotation (that is, haptic learning) on the text using pen and paper. A pdf version of this book is also freely available at https://openstax.org/details/books/college-physics-2e, which is a viable alternative provided you still physically annotate pages with your own thoughts and comments.

Note that annotating is important strategy when understanding any technical subject, whenever information density is high and the need for processing that information is also very high (see www.ted.com/talks/sunni_brown_doodlers_unite). Further, haptic learning through writing is

generally more effective than simply typing (see www.scientificamerican.com/article/a-learning-secret-don-t-take-notes-with-a-laptop/). Past experience shows that those who annotate tend to succeed most in this course.

Readings:

This course will very closely follow the required text book in covering materials from chapters 1 - 8. The sequence of the schedule of topics is listed below:
1. The nature of science and physics, units, approximation, math background
2. One-dimensional kinematics (description of motion of a particle travelling in a straight line)
3. Two-dimensional kinematics (description of motion of a particle travelling in a curve or in a circle)
4. Dynamics (causes of motion), forces, and Newton's Laws
5. Applications of Newton's Laws: friction, drag and elasticity
6. Uniform circular motion and gravitation
7. Work and energy, energy resources
8. Linear momentum and collisions

The order of topics will follow that given above and I shall regularly communicate both in class and through Blackboard about the pacing of the classes. Thus it is important to attend every lecture and also to log into Blackboard regularly.

Assessments, Assignments and Tests:

There will be four components to the grading scheme:
1. Weekly, computerized, auto-graded, **pre-class tasks** based on the pre-class readings and on solved examples from the textbook, delivered via the (free) WeBWork platform. These are to be submitted by 5 pm each Tuesday from Sep 20 onwards. No late submissions will be accepted (exceptional circumstances aside), so best to think of this as due by 5 pm each Monday. Worth 10% of grade total.
2. In-person **workshop quizzes** during each scheduled workshop, based on the readings and material from the textbook. Worth 30% of grade total.
3. Weekly, computerized, **home assignments** based on the readings, discussions in class, and on questions from the textbook, delivered again via the (free) WeBWork platform. These are to be submitted by 1 pm each Sunday from Sep 25 onwards. No late submissions will be accepted (exceptional circumstances aside), so best to think of this as due by 1 pm each Saturday. Worth 30% of grade total.
4. A **final examination**, written during the December exam period. Worth 30% of grade total.

Grading:

Weekly **pre-class tasks** (online): 10%
Weekly **workshop quizzes** (in person): 30%

End-of-week **home assignments** (online): 30%
Final exam (in person): 30%

Grade Total by Withdrawal Date:

As per the Academic Calendar 25% or more of the final grade will be available to the students by the drop date of November 8, 2022

University Policies:

Academic Integrity

Academic dishonesty, which includes plagiarism and cheating, is an extremely serious academic offence and carries penalties varying from failure on an assignment to expulsion from the University. Definitions, penalties, and procedures for dealing with plagiarism and cheating are set out in Trent University's *Academic Integrity Policy*. You have a responsibility to educate yourself – unfamiliarity with the policy is not an excuse. You are strongly encouraged to visit Trent's Academic Integrity website to learn more: www.trentu.ca/academicintegrity.

Access to Instruction

It is Trent University's intent to create an inclusive learning environment. If a student has a disability and documentation from a regulated health care practitioner and feels that they may need accommodations to succeed in a course, the student should contact the Student Accessibility Services Office (SAS) at the respective campus as soon as possible.

Sharing and Distribution of Course Content

Students in this class should be aware that classroom activities (lecture, seminars, labs, etc.) may be recorded for teaching and learning purposes. Any students with concerns about being recorded in a classroom context should speak with their professor. If a student shares or distributes course content in any way that breaches copyright legislation, privacy legislation, and/or this policy, the student will be subject to disciplinary actions under the relevant Academic Integrity Policy, the Charter of Student Rights & Responsibilities, or the Policy on the Protection of Personal Information, at a minimum, and may be subject to legal consequences that are outside of the responsibility of the university.

Student Absenteeism, Missed Tests and Examinations

Students are responsible for completing all course requirements, including attending classes and meeting assignment deadlines as specified on their syllabus.

Adjustments and deferrals to dates for participation, assignment submissions, tests, midterms and final examinations are not automatic. It is the student's responsibility to email their instructor immediately if they are unable to fulfill academic requirements.

Courses delivered remotely may involve student participation in scheduled (synchronous) classes via web-based platforms, such as Zoom. Students unable to participate (i.e., by video and/or audio) should email their instructors to request alternative arrangements for participation in these scheduled (synchronous) classes.

Students are required to be available for all tests, midterms and exams that are listed in their course syllabus and scheduled by their instructor or the Office of the Registrar. Depending on their program, the instructor or the chair/director may decide on alternative arrangements for exams and tests. Normally a doctor's note or supporting documentation is not required; however, when a student's success in the course or program is in jeopardy as determined by the instructor or chair/director, documentation may be requested.

Specific SAS accommodations can be implemented for students registered with Student Accessibility Services (SAS), but it is the responsibility of the student to make these arrangements in advance as per SAS guidelines, and to discuss accommodations of due dates with their instructors.

Students can notify the Office of the Registrar of their wish to observe cultural or religious holidays during scheduled examination periods by the deadline set in the Academic Calendar. Personal travel plans are not acceptable reasons for missing tests or exams.

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