Physics 2053: Fluids and Thermodynamics, Fall 2025

Instructor: Lev Tarasov

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best to reach me by MUN (not brightspace/D2L) email: lev@mun.ca
Office hours: will be set if/when there is a desire in the class for set hours that can accommodate all students. Otherwise, see me after class or send me an email with your available times for the next 36 hours and I should be able to slot you in (at least on a Monday, Wednesday, and Friday).

Prerequisites: Math 1001, Physics 1051 (or Physics 1021 with minimum average 70%)

Course web page: on D2L. Also please register and enrol in the Mastering Physics (at Pearson: `https://mlm.pearson.com/enrollment/tarasov54604`), Course ID: tarasov54604

Lectures: Tu,Th 12:00-12:50, Fr 1:00-1:50 in C2045

Text: Young & Freedman, University Physics, Edition 15 (Pearson Canada)

Evaluation: Assignments 25% (a mixture of written/Mastering Physics and in-class)
Labs 25% (details on 2053 Lab D2L shell)
Mid-term test 20% (tentatively Oct 23)
Final Exam 30% (date to be announced by MUN Registrar)
Note: no supplementary exam is available

Course Approach: Learning requires engagement (R.I.P. sponge pseudo-theory of learning). Classes will be participatory with exercises involving: problem solving, pair and whole class discussion, and flash card polling. Each student will be expected to participate in individual and group activities during class.

To encourage a focus on problem solving skills (and not rote memorization), a single sided 8.5 by 11 inch crib sheet will be allowed for the mid-term and a two-side crib sheet for the final (I do NOT provide a formula sheet). Tests/exams are closed book and cumulative in content with a focus on more recent material.

If you are struggling: Let me know as soon as possible and we can figure out a plan to address this. There are many different learning styles and each of us have different strengths/weaknesses.

Warning You do need to: engage, understand the core material, and develop the basic problem solving skills to succeed. This is not a course you cram for before the mid-term and final.

	Course Outline
	This course introduces the application of three fundamental conservation laws (mass, energy, momentum) to understanding much of what we see in the world around us, from climate to internal combustion engines and refrigerators:
Module 1:	Fluids: Pressure, buoyancy, streamlines, laminar flow and continuity, Bernoulli's principle, non-laminar flow
Module 2:	Temperature, Energy and the First Law: Temperature and Zeroth Law, thermal expansion, ideal gases and the kinetic theory of gases, phase changes, First Law, adiabatic processes, heat transfer
Module 3:	Heat Engines and the Second Law: Heat Engines, Heat Pumps and Refrigerators, Entropy and the Second Law

Labs:: Students will have an opportunity to do 7 laboratory experiments. Each of them is preceded with a prelab which consists of a couple of questions relevant to the material covered by a particular experiment. Only Experiment 1 is done by all students at the same time. After that students are split into groups of 2 and go according to the lab calendar.

	List of experiments:
1	Measurements of temperature
2	Bernoulli's Equation
3a	Viscosity of Water
3b	Viscosity of Sugar Solution and Glycerine
4	Phase change in Water
5	Linear expansion
6	Ideal Gas Law
7	Isothermal and Adiabatic Processes
	For further information see 2053 Lab D2L shell

Academic Integrity, and missed tests/exams Students are responsible for following regulations concerning academic integrity: http://www.mun.ca/regoff/calendar/sectionNo=REGS-0748
Ditto for missed tests and exams and all the other regulations you've seen in previous course outlines. Most importantly, communicate with your instructor if any issues arise or are about to arise.

Original work, completed wholly by you, is expected to be submitted in this course. The use of an AI tool like ChatGPT is not permitted.

Equity/Diversity/Inclusivity (EDI) statement: For those of you struggling to cover tuition and living expenses, it is bittersweet that standard EDI statements (such as recommended by our Faculty of Science) tend to ignore economic class. This gap is even more acute for those who can't afford to attend University. These statements also completely ignore the deteriorating inter-generational equity with your generation being handed a world with increasing geo-political and environmental instability thanks in good part to growth oriented capitalism. This deterioration in inter-generational equity is further driven by the fiscal/monetary policies of our governments and central banks that have supported a large wealth transfer to the top income bracket over the last 40 or so years in Canada and most other OECD countries. Nevertheless, any form of prejudice just make things worse, so please reflect on how you interact with others. Also consider the responsibility to challenge any prejudice you see as otherwise you become complicit by silence. And if there is anything in class happening that makes you feel denigrated, please let me know.

Precautions for Covid-19 (still kicking around) and any possible new pandemics that may arise (facilitated by the Trump/Kennedy shut down of the U.S. Center for Disease Control's infection control committee and imposed termination of the Center's collaboration with the World Health Organization as well as the anti-vax movement). If you are feeling sick, please stay home. We will also keep some windows open to improve ventilation.