

Overview. This is a special section of MATH 253 dedicated to the MECH 2 program. This award-winning collaborative model for Engineering education involves a cohort of students who enjoy an intensive, integrated experience in which lectures, labs, and tutorials are closely coordinated. Details of the Mech 2 program are online at

<http://mech.ubc.ca/undergraduate-students/mech-2/>

Syllabus. By the end of this course, the students should be able to ...

- Express curves, surfaces, and solids in space using functions, equations and inequalities.
- Visualize functions, equations, and inequalities using curves, surfaces, and solids.
- Make local linear approximations to functions, and visualize them geometrically.
- Find local maximum and minimum values for a given function of several variables, and apply this skill in practical problems.
- Set up single, double, and triple integrals that represent length, work, area, volume, force, flux, and other physical quantities.
- Evaluate such integrals, both analytically and numerically.
- Use partial derivatives and appropriate integrals to analyze time-varying processes (like flying point particles or flowing fluids) in space.
- Exploit vector extensions of the Fundamental Theorem of Calculus to solve problems involving work, potential, and fluid flow.

Textbook. One of the following:

- James Stewart, *Multivariable Calculus*, 7/e. Thompson Learning, 2012.
- James Stewart, *Calculus: Early Transcendentals*, 7/e. Thompson Learning, 2012.

(The first-named volume is a selection of chapters from the second.)

Evaluation. MECH 2 is so deeply interdisciplinary that it's impossible to separate a student's performance into subject-specific grades. Students in the program are assessed as described on the website cited above. A student's grade in this section of MATH 253 will be the same as that student's grade in the 7-credit companion course MECH 222. Much more detail is provided in the *Mech 2 Handbook* and the Vista site associated with the program.

Instructor Information. In Jan-Mar 2013, MATH 253 for MECH 2 will be delivered by Professor Loewen. Office hours are by appointment in room MATH 207. Email loew@math.ubc.ca to book a meeting. (Include "Mech" in the subject line to distract the spam-fighting robotic watchdog.)