

This course is intended for students in Honours Mathematics and in Mathematics and Engineering. It is also taken by many students in Honours Physics. More than half of the students will be using vector calculus in electromagnetism course during the second (winter) term, so it is important that the integral theorems are emphasized in this course. Those students who take STAT-251*, will need the change of Variable Theorem, covered halfway through the course.

Textbook: *Vector Calculus*
by M. Lovric (Addison-Wesley)

Prerequisite: MATH-120 and 110, or APSC-171* and 172* and APSC-174*.

Instructor: M. Roth

Evaluation:	Homework	10%
	Midterm Exam	30%
	Final Examination	60%

Outline:

1. Maps from \mathbb{R}^n to \mathbb{R}^m , graphs, level sets, sections, limits, continuity, partial derivatives, tangent plane, differentiability, properties of the derivative.
2. Chain rule, directional derivative, gradient, iterated partials.
3. Path, velocity, acceleration, curvature, arclength, Vector fields, flows, div, curl, vector identities, cylindrical and spherical coordinates.
4. Double integrals, interchange of order, triple integrals (Cartesian coordinates), maps, Jacobians, determinant and volume, change of variables.
5. Path and Line integrals, conservative vector fields and curl.
6. Parameterized surfaces, scalar and vector surface integrals, Stokes' and Green's theorem, Gauss' divergence theorem, applications of the integral theorems to physics.