

MATHEMATICS 3202
VECTOR CALCULUS

Elementary calculus solves the problem of describing and predicting how solid objects move. Where will this brick land if I throw it? How hard would I need to throw it for it to go into orbit? What would its orbit be? But what about non-solids — fluids, gases, molasses, gooey doughnuts — how do these move? You may be able to throw a doughnut, but you can't throw a handful of air. The right question to ask here is, of course, how do these non-solids flow? Fluids and gases flow. Do gooey doughnuts flow? Throw one and watch it land! Vector calculus provides us with the language and the tools to describe and predict the flow of a fluid.

On another level, vector calculus establishes fundamental connections between diverse areas of abstract mathematics, and theoretical physics.

Text. *Calculus: Early Transcendentals (loose-leaf edition)* by Jon Rogawski

Marks. Marks are generally assigned as 40% for term work and 60% for the final exam.

Calendar description. **3202 Vector Calculus** deals with functions of several variables, Lagrange multipliers, vector valued functions, directional derivatives, gradient, divergence, curl, transformations, Jacobians, inverse and implicit function theorems, multiple integration including change of variables using polar, cylindrical and spherical co-ordinates, Green's theorem, Stokes' theorem, divergence theorem, line integrals, arc length.

Prerequisite: Mathematics 2000 and 2050.

Note: Credit cannot be obtained for both Applied Mathematics/Pure Mathematics 3202 and Physics 3810.

Offered. Fall, Winter, Spring