UNIVERSITY OF CALGARY

FACULTY OF SCIENCE
Department of Mathematics and Statistics

Mathematics 331 Multivariate Calculus

(see Course Descriptions for the applicable academic year: http://www.ucalgary.ca/pubs/calendar/)

Syllabus

Topics	**Number of Hours**
First order ordinary differential equations. Higher order linear homogeneous equations. Undetermined coefficients. Variation of parameters	10
Systems of linear Ordinary Differential Equations	8
Functions of several variables, graphs and level curves, partial derivatives, differentiability and gradient, repeated partial derivatives The chain rule, the tangent plane, directional derivatives, example of Partial Differential Equations	9
Standard version of Green's theorem, line integrals	3
Vector fields, Gauss Theorem, Stokes theorem	6
TOTAL HOURS	**36**

MATH 331 – Multivariate Calculus
Course Outcomes

Overview

The course introduces the main solutions techniques for ordinary scalar and linear systems of differential equations. It also extends the differential and integral calculus of single variable functions to multivariate functions.

Upon completing the course, students should be able to

1. compute first and higher order partial derivatives, apply the chain rule and polar coordinates, check whether a given function is a solution of a partial differential equation or not;
2. solve first order linear, separable and exact equations, identify exact differentials, apply techniques for first order equations to practical models in chemistry;
3. find solutions to higher order linear homogeneous ordinary differential equations, identify orthogonal functions;
4. write a system of linear first order differential equations in a matrix form and find the general solution for homogeneous systems with constant coefficients using eigenvalues and eigenvectors;
5. evaluate double and triple integrals using a change of variables, compute a curl and a divergence of a vector field, distinguish between conservative and non-conservative fields, evaluate line integrals and apply Green's theorem;
6. estimate probability of an event in a finite sample space, evaluate parameters of a normal distribution;
7. connect the Fourier Transform with the frequency domain representation of a function.

16:11:03

JM