Lectures: Mon. 4:00-5:15 pm., Thurs. 4:00-5:15 pm,  
Tue. 5:30 – 6:20 pm  
Classroom: Room 101, Freeman Hall  
Instructor: Kunal Das  
Office: 210 Freeman Hall  
Phone: 718-817-4181  
Email: kdas@fordham.edu  
Office Hours: Tue. 2:00 – 4:00 p.m., Thurs. 12:00 – 2:00 p.m.  
or walk in any time I am in my office  

Scope of the Course: This course is the first in a sequence of four courses offered in the  
physics department aimed at providing students with the essential mathematical tools used in  
physics and engineering. The course will be focused on the theory and solution of linear  
differential equations and on multivariable and vector calculus. In addition, the Mathematics  
programming software Mathematica will be introduced and used to solve problems related to  
the material in this course.  

Textbooks + Software:  
Primary: Multivariable Calculus (8th Ed), Anton, Bivens, and Davis (Wiley)  
         Differential Equations with Applications, P. D. Ritger and N.J. Rose (Dover)  
Supplemental: Mathematical methods in the Physical Sciences (3rd Ed), M. L. Boas (Wiley)  
Mathematica for Students (Software) Wolfram Research  

Grading: Homework: 10%  
         Quizzes 15%  
         Mathematica: 10%  
         Midterm – I: 20%  
         Midterm – II: 20%  
         Final: 25%  

Homework problem sets will be assigned regularly during the semester. A random selection of  
problems from each set will be graded. Late homework will not be accepted. Quizzes will be  
based primarily on homework problems.
Course Outline

- Methods for Solving First Order Differential Equations
- Applications of First order Differential Equations
- Linear Second Order Differential equations
- Applications of Linear Second Order Differential Equations
- Series Solutions
- Systems of Linear Differential Equations
- Vector Algebra
- Gradient, Divergence, Curl, Laplacian, Line Integrals,
- Green’s theorem, Divergence Theorem, Stoke’s Theorem
- Multi-dimensional Integrals
- Line Integrals
- Surface Integrals, Flux

Mathematica: Basic commands and usage for simple mathematical problems will be covered initially, followed by applications to selected problems from the material covered in the course.