Massachusetts Institute of Technology
MITES 2009

Calculus II : Vector Calculus & Ordinary Differential Equations
Course Syllabus

Instructor: Hyun Youk
- E-mail: hyouk@mit.edu
- Phone: 617-324-5042 (Lab). 617-512-7075 (Cell: No signal when I'm in the lab).
- Office Hours: (Day): **Sun.: 2:00 PM - 3:00 PM in Simmons 6/7th floor lounge.**
  (Evening): **Mon, Fri. : 7-9 PM in Simmons 6/7th floor lounge.**
  For other times, just send me an e-mail. Since I work and live on campus, it is quite easy for me to come to Simmons' common study space on other evenings (including weekends) or meet you at other campus locations during the day.

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Recitation Instructor: Nicholas Villalva
- E-mail: villalva@mit.edu
- Phone: 713-248-5367 (Cell).
- Available to help you out at any time!

Lectures take place on Mon, Wed., and Fri.: 10:45 AM - 12:15 PM in Rm. 2-105.
Recitation takes place on Thrs.: 3:45 - 4:45 PM in Rm. 2-105.
Course web page: http://web.mit.edu/hyouk/www/MITES2009.html

Tentative course outline:
1. Review of differentiation and integration using one variable.
2. Vectors, geometric manipulation of vectors, spherical and cylindrical coordinate systems
3. Derivatives & Gradients of multivariable functions
4. Taylor's theorem, Lagrange multipliers.
5. Divergence, curl, arc lengths, and vector fields.
6. Double and triple integrals, techniques of integration.
7. Integrals over paths and surfaces, line integrals, area of a surface.
8. Integral theorems of vector analysis: Green's, Stoke's, Gauss' theorems.
9. Simple ordinary differential equations to model real-world systems.

Math prerequisites: Some previous exposure to calculus (taking derivatives and integrals) is a prerequisite for this class. But you don't have to be the ultimate calculus guru; we will review derivatives and integrals in the first week of class. No previous exposure to matrices and differential equations is assumed. I will assume that most of you have taken between a half to a full year worth of calculus course in high school.

Note about problem sets: The only way to learn math is working through lots of different types of problems. Just as you can't learn how to play the violin or the saxophone by reading sheet music or watching another person playing the instrument, you cannot learn any math just by watching someone (your friend, your instructors) solving the problems for you, or by reading textbooks and lecture notes. You must think through a problem, write down equations and principles to solve it, and then go over your solution to make sure you understand why you wrote down each and every step. By all means, I encourage you to work with your classmates on the problem sets. But you should **always** write your own solutions (not copying your friend's solutions or what your instructor tells you during help sessions).

Problem sets are due at 9 AM on Tuesday. Deliver it to Nick in his dorm room.