

**MathU242**  
**Fall, 2007**

**Calculus for Science and Engineering**  
**Instructor: Nizar Zaarour**

## **Syllabus**

**Text: *Calculus, Concepts and Contexts, Vol. 1 (and Vol 2 later)* by James Stewart**

**My Office: 540A NI**

**Class Meetings: M 10 – 12 & W 9:30 – 10:30**

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## **Introduction**

This course is a one-semester continuation of the subject of Calculus, following the material covered in the syllabus of MathU241 during the fall semester of 2005. We will use the **Integral Calculus** to describe growth and size in physical processes. This focus on the mathematical modeling of reality will frequently lead us to solve word problems. The difficulties in solving word problems involve language and our intuition about reality as much as they involve mathematics.

We will work on this arena of common concern to students of mathematics, the sciences and engineering. We will study **separable differential equations** in this process. We will also study **infinite series**, **power series** and the study of vectors in two and three dimensions.

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**The three main goals of the course are:**

**To understand the concept of the integral and to display that understanding through a variety of applications**

**To gain an understanding of the rudiments of the algebra of vectors in the plane, and space.**

**To understand the use of Taylor's Series as approximations to functions**

## Grades and Organizational Matters

The instructor reserves the right to change this syllabus according to the needs which may arise in this class during this semester. Students are responsible to be aware of what goes on in the classroom including the announcement of exam dates, material to be covered on exams and any adjustments to this syllabus. If you have any questions that you are not comfortable asking in class please feel free to ask me after class or come to my office hours.

If I am unavailable or you wish to speak with someone else about this course, you should contact the Chairman of the Mathematics Department, Professor Robert McOwen. Professor McOwen's office is 505 Lake Hall, his telephone number is 617-373-5635 and his e-mail address is [mcowen@neu.edu](mailto:mcowen@neu.edu)

**The two hour, common, commonly graded, final exam will count as 40% of your grade in this course.**

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It is my practice to translate numerical grades into letter grades as follows: 93 and over = A; 90-92 = A-; 87-89 = B+; 83-86 = B; 80-82 = B-; 77-79 = C+; 73-76 = C; 70-72 = C<sub>-</sub>; 67-69 = D+; 63-66 = D; 60-62 = D<sub>-</sub>; and below 60 = F. I round up 0.5 and more to 1, 0 to 0.49 to 0.

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## Departmental Policies

**Excused Absences or Late Work:** In order to turn in assignments late or to take make-up quizzes and tests, students must bring written proof of some emergency situation; notes from doctors or nurses, documents verifying court appearances, receipts from having a car towed are all examples of valid documentation. Notes from family members are not acceptable. If a situation is of a personal nature, discuss the matter with your academic advisor; an e-mail message from your advisor saying that they believe that you should be allowed to make-up work is acceptable.

**Cheating is an insult to honest students:** It will not be tolerated. The University's cheating policy and related disciplinary actions are detailed in the Student Handbook; the Handbook also includes a description of what is considered cheating by the University. Cheating in this class includes (but is not limited to): looking at the papers of others during a quiz or test, talking to other students during a quiz/test, looking at notes during a quiz/test (unless it is specifically announced that you may), copying other students' work outside of class, and obtaining help from others on take-home tests. In this class, working together on homework is NOT considered cheating. Please be aware that this policy on working together outside of class varies greatly from one course to the next; the policy on what is allowed, that has been described in this paragraph, may well be considered cheating in your other classes. The use of advanced calculators is NOT considered cheating in this course. Be aware, however, that other courses may well have a policy barring such calculators. Also, your instructor reserves the right to decide on the spot between what constitutes a "calculator" and what constitutes a full-fledged "computer". All incidents of cheating will be reported to the Office of Judicial Affairs. If you have any questions as to what constitutes cheating, please ask me.

**Attendance:** It is essential that you attend class regularly. The easiest way for you to learn the material, and to know what material has been covered, is to come to class each day. Students are responsible for finding out what material has been covered or what announcements have been made on days that they miss class.

Please note that we will treat you as an adult here. If you must miss a class, be late or leave early, it is expected, as polite behavior, that you will contact the instructor involved ahead of time and reach an agreement. This sort of behavior goes a long way when you have to miss a quiz, for instance. If you do not do this, the ball is in your court to make up work or use the missed quiz as the quiz which you drop.

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## Schedule of Topics and Assignments

The following table includes a calendar with homework problems to be covered. They may change as we progress through the course.

Section	Topic	Assignment
5.5 5.6	Substitution Integration by Parts	<b>p. 392</b> #1-6, 7, 10, 11, 13, 14, 21, 22, 24 <b>p. 398</b> #1-4, 8, 9, 11,17, 21,25,28
7.3 5.9	Separable Diff. Eqs. Numerical Integration	<b>p. 519</b> #1-5, 8-11, 15, 16 <b>p. 421</b> #1, 7a, 7c, 8a, 8c, 25a,25c
5.9 (Cont'd) 5.10	Improper Integrals	<b>p. 431</b> #1, 2, 5, 9, 13, 17, 25, 27, 49
6.1 6.2	Areas Between Curves Volumes by Cross Sections	<b>p. 446</b> #1-7, 11 <b>p. 457</b> #1-7, 13, 14, 29
6.3 6.5	Arc Length Work	<b>p. 465</b> #1, 3-7 <b>p. 479</b> #1, 3, 4, 7, 9, 13, 15, 17a
8.1	Sequences	<b>p. 565</b> #2, 3, 5, 7, 9, 11, 13, 14, 18, 37, 40, 41
8.2 8.3	Series Integral & Comparison Tests	<b>p. 574</b> #11-13, 17, 19, 21, 35, 48 <b>p. 585</b> #1, 3, 4, 6-8, 11, 15, 17,19
8.4 8.5	Other Convergence Tests Power Series	<b>p. 592</b> #2, 9, 13, 14, 19, 21, 23, 31, 33, 35 <b>p. 598</b> #3, 5, 7, 13, 17
8.6 8.7	Functions as Power Series Taylor & MacLauren Series	<b>p. 604</b> #1, 2, 3, 5, 11, 21, 25 <b>p. 615</b> #3-5, 7, 13, 15, 19, 22, 34, 37, 53
H1 9.1 9.2	Polar Coordinates 3-D Coordinates Vectors	<b>A66</b> # 1-9 (odd), 13, 17, 23, 29 <b>p. 641</b> #1, 3, 8, 13, 29 <b>p. 649</b> #4, 15, 16, 23-26
9.3 10.1	Dot Products Vector Functions, Curves	<b>p. 655</b> #4, 5, 6, 7, 13,15, 17,24,25 <b>p. 700</b> #1, 3, 7, 13, 17-22
10.2	Derivatives and Integrals	<b>p. 707</b> #3, 5, 9, 11, 15, 16
10.3 10.4	Normals & Lengths (no curvature) Motion in Space	<b>p. 714</b> #1, 3, 7, 9, 10, 37 <b>p. 725</b> #1, 3, 7, 9, 11, 13-17