

MathU242  
Spring, 2005

Calculus II  
Syllabus

Text: Johnston & Mathews Calculus, Addison Wesley

Instructor: J. Shah  
Office: 523 Lake  
Office Hours: MWTh 12:50-1:40

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Calculator: We require the use of graphing calculators in class.

URL for the course: <http://www.math.neu.edu/>

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 2004. We will use the Integral Calculus to describe growth and size in physical processes. This focus on mathematical modeling of reality will frequently lead us into word problems. The difficulties in word problems involve language and our intuition about reality as much as mathematics. We will work on this area of common concern to students of mathematics, physics and engineering. We will study separable differential equations in this process. We will also study infinite series, power series and the beginnings of Linear Algebra through the study of vectors in three dimensions.

The instructor reserves the right to change this syllabus according to the needs which may arise in this class during the course of the 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 which you are not comfortable asking in class please feel free to come to my office during my office hours or send me an email.

We hope that your experience in Calculus II is a good one. However, if you have any concerns or complaints about how the course is proceeding, your first step should be to talk with your instructor. If this course of action does not seem to help, or if you are uncomfortable discussing the problem with your instructor, you should contact the course coordinator:

Prof. Maurice Gilmore    443 Lake Hall    617-373-5675    [gilmore@neu.edu](mailto:gilmore@neu.edu)

If Prof. Gilmore is unavailable or you wish to talk with someone else, you should contact the Vice-Chairman of the Mathematics Department:

Prof. Donald King    447 Lake Hall    373-5679    [donking@neu.edu](mailto:donking@neu.edu)

### **Course Objectives:**

This course has two main goals: to have students understand the concept of the integral and to enable students to display that understanding through a variety of applications, and to gain the rudiments of the algebra of vectors. Specific, measurable, manifestations of your understanding that will be tested during the semester include your

ability to:

Calculate antiderivatives of algebraic, trigonometric, and transcendental functions

Calculate antiderivatives using substitution, integration by parts, and partial fractions

Calculate antiderivatives using tables

Solve differential equations which simply require antidifferentiation and insertion of initial data

Approximate definite integrals using finite sums

Calculate average values, areas, volumes, lengths and work using definite integrals

Approximate definite integrals using the Trapezoidal Rule and Simpson's Rule

Determine whether improper integrals (integrals involving infinity) converge or diverge, and calculate their value if they converge

Derive Taylor polynomials and series and estimate errors using them

Recognize and calculate with geometric series, and be able to use the ratio test and the alternating series test with its error term

Derive equations of lines in three dimensional space

Understand dot and cross products

**Grading Policies:** There will be weekly quizzes which will usually be during the first 20 minutes of the class on Thursday. We will have an hour exam on February 25th. Your grade in this course will be calculated using your quiz average for %, your hour exam for % and your 2-hour final exam for 40%. **THERE WILL BE NO MAKE-UPS** and you can drop your lowest quiz score. If you miss a quiz, use the missed quiz as the quiz which you drop. My usual understanding is that numerical grades translate into letter grades as follows:

Over 92 = A; 90-92 = A-; 87-89 = B+; 83-86 = B; 80-82 = B- ; 77-79 = C+;

73-76 = C; 70-72 = C-; 67-69 = D+; 63-66 = D; 60-62 = D- and below 60 = F

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), and copying other students' work outside of class.

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 here, 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.

**Algebra Proficiency:** A common problem in calculus courses is that students learn the calculus material, but have such weak algebra skills that they rarely obtain correct

answers to problems. We will require correct algebra work throughout the semester. Even though this is a calculus course, you will lose points for pre-calculus errors.

**Algebra and Calculus Help and Tutoring:**

There are many resources for improving your algebra and calculus skills. The best strategy is to ask questions in class and see your instructor during his office hours.. Other resources: walk-in tutoring in Cahners Hall and from Engineering tutors in 222 Snell Engineering, tutoring by appointment (sign up in the Media Center in the library), and study aids in the library.

**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.

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

## Schedule of Topics and Assignments

Week 1, Jan. 5-7:	Review of section 5.5 on substitution and basic formulas # 1-40 ?5.6 Areas between curves, # 1, 7, 8, 15, 16, 19, 25, 29
Week 2, Jan. 10-14:	?5.7 Integration by parts, # 1, 3, 4, 5, 9, 12 ?5.8 Integration by partial fractions, # 19, 22, 26, 44, 49
Monday, January 17th :	Martin Luther King, Jr.'s Birthday: Univ. closed
Week 3, Jan. 17-21:	?5.9 Separable differential equations # 1, 4, 7, 10, 19, 23, 25, 28
Wed. Jan 19th :	Last day to file a final exam conflict form.
Friday, January 21st :	Last day to drop without a W grade
Week 4, Jan. 24-28:	?5.10 Numerical integration # 1, 2, 3, 12, 14 ?6.1 Volumes by cross section # 1, 7, 12, 13, 20, 21, 29
Week 5, Jan. 31 <sup>st</sup> -Feb. 4:	?6.2 Volumes by shells # 3, 9, 13, 21 ?6.3 Polar coords. & parametric eqns. # 13, 15, 22, 23, 25
Week 6, Feb. 7-11:	?6.4 Arc length & unit tangents # 4, 10, 19, 25 ?6.5 Areas in polar coords. # 2, 3, 5, 10, 25
Week 7, Feb. 14-18:	?6.6 Work # 1, 2, 6, 10, 27, 30
Week 8, Feb. 21-25:	?6.9 Improper integrals # 2, 3, 9, 14, 19, 29 ?7.1 Taylor polynomials # 3, 7, 12, 18, 25, 29, 30
The week, of Feb. 28 to Mar. 4 is spring break. Work like a dog. Catch up in all of your courses.	
Week 9, Mar. 7-11:	?7.2 Approximations and error # 1, 4, 7, 8 Hour Exam on Feb. 24th. ?7.3 Sequences # 3, 5, 11, 13, 14, 18, 22, 25, 28, 30, 32
Week 10, Mar. 14-18:	?7.4 Infinite series # 3, 6, 7, 14, 15, 19, 23, 36, 40 ?7.5 Tests for convergence # 3, 9, 12, 14, 25

