

**Math1124
Winter, 2003**

Syllabus

**Engineering Calculus II
Professor Gilmore**

Text: *Thomas' Calculus, Early Transcendentals*, 10th Edition, by Finney, Weir, and Giordano

Class Meetings: 9:15-10:20 on M., W. & Th. in Room 302 Kariotis Hall.

My Office: 443 Lake Hall

Phone: 373-5675 (office)
or 373-2450 (Department)

Key Number: 02700

e-Mail: gilmore@neu.edu

Office Hours:

in 443 Lake Hall

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

URL for the course: <http://www.math.neu.edu/undergrad/mth1124/>

Prerequisites: Successful completion of Math1123, Engineering Calculus I, or the equivalent.

This course is a one-quarter introduction to the Integral Calculus. We will use this powerful collection of mathematical ideas to model accumulation processes. If $R = \frac{D}{T}$, or

$R(T) = \lim_{t_2 \rightarrow t_1} \frac{D(t_2) - D(t_1)}{t_2 - t_1}$, is a simplified view of the first calculus course about

derivatives and rates, then the corresponding equation for the winter is $D = RT$. Here $D(T)$ will involve another kind of limit, perhaps calculating the distance traveled as a function of time.

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.

The instructor reserves the right to change this syllabus according to the needs which may arise in this class during the course of the quarter. 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 ask me after class or come to my office hours.

We hope that your experience in Calculus II for Engineers 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 373-5675 gilmore@neu.edu

If Prof. Gilmore is unavailable and 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

Course Objectives:

This course has one all-encompassing goal: to have students understand the concept of the integral and to enable students to display that understanding through a variety of applications. Specific, measurable, manifestations of your understanding that will be tested during the quarter 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, work, moments, masses, and centers of mass using definite integrals
- Approximate definite integrals using the Trapezoidal Rule and Simpson's Rule
- Calculate limits using L'Hopital's Rule
- Determine whether improper integrals (integrals involving infinity) converge or diverge, and calculate their value if they converge

Grading Policies: We will get to know one another and will teach each other. There will be activity for you to do on your own and with other students in many class sessions. Mathematics is not a spectator sport. 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 13th. Your grade in this course will be calculated using your quiz average for 30%, your hour exam for 30% and your 2-hour final exam for 40%. There will be no make-ups and you can drop your lowest quiz score. 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

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 quarter. 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 go over any problems with your instructor. 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 (Schaum's Outlines are great).

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.

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.

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.

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

Schedule of Topics and Assignments

Week 0, Jan. 3:	§4.3 Estimating with finite sums 1-7 odd, 15, 17, 18, 21.
Week 1, Jan. 6-10:	§4.4 Riemann sums and definite integrals # 1-3, 7, 13-18, 23-25, 27, 30. §4.5 The mean value and fundamental theorems # 1, 3, 4, 6, 9, 19-22, 29, 30, 33, 36-38, 45, 49.
Week 2, Jan. 13-17:	§4.1 Indefinite integrals, diff. eqns., and modeling # 1, 2, 4, 5-15 odd, 18, 20, 27, 28, 31, 33-36, 47, 50, 57, 60. §4.2 Integral rules; integration by substitution # 1-5, 11-15, 17, 21, 30, 31, 34, 45, 49, 50, 57, 61.
Friday, January 17:	Last day to drop without a W grade

- Monday, January 20: Martin Luther King, Jr.'s Birthday: **Univ. closed**
- Week 3, Jan. 21-24: β 4.6 Substitution in definite integrals # 1-5, 7, 11, 15, 17, 19, 20, 24, 25, 30.
 β 4.7 Numerical integration 5-11 odd, 15, 17.
- Week 4, Jan. 27-31: β 5.1 Volumes by slicing and rotation about an axis # 1, 3, 10, 13, 15, 16, 17, 24, 28, 35, 41, 45.
 β 5.2 Modeling volume using cylindrical shells # 1, 2, 4, 9, 15, 23 a,b, 25, 28 a,b.
- Week 5, Feb. 3-7: β 5.3 Lengths of plane curves # 1-3, 11, 15, 21, 23.
 β 5.7 Moments and centers of mass # 1, 5, 8, 9, 11, 13, 16, 25, 26.
- Week 6, Feb. 10-14: β 6.1 Logarithms # 2, 4, 5, 8, 29, 31, 35, 36, 47, 51, 53.
Hour Exam on Feb. 13th.
 β 6.2 Exponential functions # 2, 4-6, 15, 16, 19, 23, 25, 33, 34, 39, 45, 47, 49, 50, 57, 61.
- Week 7, Feb. 17-21: β 7.1 Basic integration formulas # 1, 6, 7, 27, 29, 37, 40, 47, 50, 53, 55, 83 a.
 β 7.2 Integration by parts 1, 5-7, 9, 21, 26, 29, 39.
- Friday, February 21 Last day to drop **with a W** grade
- Week 8, Feb. 24-28: β 7.3 Partial fractions # 1, 4, 6, 9-11, 17, 21, 30, 35.
 β 7.5 Integral tables, computer algebra systems, and Monte Carlo integration # 1, 3, 4, 6, 17, 23, 24, 27, 33.
- Week 9, Mar. 3-7: β 7.6 L'Hopital's Rule # 1, 2, 7, 8, 15, 34, 43.
 β 7.7 Improper integrals 1, 2, 5, 7-9, 11, 12, 17, 33, 67, 68.

Exam Week: Mar. 10-14.

Note : The dates indicated for exams and quizzes are only tentative. They are subject to change within reason. You are responsible to keep informed about such date changes on your own.