

## Math 2413: Calculus I

Fall 2009

### Course Meeting Times:

Section 3:

MWF 11:00 — 12:25

Section 4:

MWF 14:00 — 15:15

**Professor:** Dr. Stephen Graves

**Office Hours:**

**Office:** RBN 4011

MWF 8:00 – 9:45 AM

**Phone:** (903) 565-5679

Open Door Policy

**Email:** sgraves@uttyler.edu

Also by Appointment

Email is the preferred method of contact, and it is checked throughout the day.

Updates to this syllabus and additional course materials will be published online at:

<http://www.math.uttyler.edu/sgraves/>

### MATH 2113 Lab Meeting Times:

Tuesday 9:30 AM — 10:45 AM

Tuesday 11:00 AM – 12:15 PM

Math majors and minors are **required** to take this lab. All others may take the lab but it is not required. However, anyone considering a math minor or math double major is highly encouraged to take this course.

## COURSE INFORMATION

**Course Description:** A study of functions, limits, continuity, differentiation of algebraic and trigonometric functions, applications of the derivative, and definite and indefinite integrals, with applications.

**Course Prerequisites:** You must satisfy one of the following

- Have a grade of C or better in a college trigonometry class (Math 1316 or equivalent).
- Have a grade of C or better in a Mathematics Department approved college level pre-calculus course (this is Math 2412 in Texas but is not offered at UTT).
- Pass a trigonometry placement test administered by the Department of Mathematics.
- Score of 675 or higher on the SAT (quantitative section).
- Score of 27 or higher on the ACT (math section).

**Student Learning Outcomes:** Upon completion of this course, students should be able to do the following:

- Discuss solutions to the tangent and area problems involving calculus concepts of limits, derivatives, and integrals.
- Use graphs of algebraic and transcendental functions to determine limits, continuity, and differentiability at a point.
- Determine whether a function is continuous and/or differentiable at a point using limits.
- Apply differentiation rules to differentiate algebraic and transcendental functions.
- Choose appropriate calculus concepts and techniques to provide mathematical models of real-world situations and determine solutions to applied problems.
- Compute definite integrals using the Fundamental Theorem of Calculus.
- Recognize and discuss the relationship between derivatives and integrals using the Fundamental Theorem of Calculus.

## COURSE CONTENT

### Required Text:

Stewart, James. *Essential Calculus, Early Transcendentals* , 1<sup>st</sup> edition, Thomson Brooks/Cole 2007, ISBN: 0-495-01428-1. (Some online sites list this book as published in March 2006, or give ISBN: 0-495-01428-7.)

**Calculator Policy:** No calculators will be allowed on quizzes or exams.

### List of Course Topics:

#### Chapter 1. **Functions and Limits**

- Section 1.3: The Limit of a Function
- Section 1.4: Calculating Limits
- Section 1.5: Continuity
- Section 1.6: Limits Involving Infinity

#### Chapter 2. **Derivatives**

- Section 2.1: Derivatives and Rates of Change
- Section 2.2: The Derivative as a Function
- Section 2.3: Basic Differentiation Formulas
- Section 2.4: The Product and Quotient Rules
- Section 2.5: The Chain Rule
- Section 2.6: Implicit Differentiation
- Section 2.7: Related Rates
- Section 2.8: Linear Approximations and Differentials

#### Chapter 3. **Inverse Functions: Exponential, Logarithmic, and Inverse Trigonometric Functions**

- Section 3.1: Exponential Functions
- Section 3.2: Inverse Functions and Logarithms
- Section 3.3: Derivatives of Logarithmic and Exponential Functions
- Section 3.4: Exponential Growth and Decay
- Section 3.5: Inverse Trigonometric Functions
- Section 3.6: Hyperbolic Functions

#### Chapter 4. **Applications of Differentiation**

- Section 4.1: Maximum and Minimum Values
- Section 4.2: The Mean Value Theorem
- Section 4.3: Derivatives and the Shapes of Graphs
- Section 4.5: Optimization Problems
- Section 4.6: Newton's Method
- Section 4.7: Antiderivatives

#### Chapter 5. **Integrals**

- Section 5.1: Areas and Distances
- Section 5.2: The Definite Integral
- Section 5.3: Evaluating Definite Integrals
- Section 5.4: The Fundamental Theorem of Calculus
- Section 5.5: The Substitution Rule

### COURSE TIMELINE

**Attendance Policy:** Attendance is mandatory and attendance records will be kept. Notify the professor in advance if you must miss a class, be late for a class or leave early. (Official University Policy: Class attendance is the responsibility of the student. When a student has a legitimate absence, the instructor may permit the student to complete missed assignments. In many cases class participation is a significant measure of performance, and non-attendance may adversely affect a students grade. When a students absences become excessive, the instructor may recommend that the student initiate a withdrawal.)

**Tentative Schedule:**

This schedule should give you a *rough* idea of the pace of the course. Topics in calculus build upon one another rapidly, so it is critical to stay current with course topics. The easiest and most profitable way to do so is to work on problems, specifically the homework and any other problems suggested in class.

Week of:	Topics:
Aug 26—Aug 28	Syllabus, Review, Pretest, Section 1.3
Aug 31—Sept 4	Sections 1.3, 1.4 and 1.5, Quiz
Sept 7—Sept 11	Labor Day, Sections 1.5 and 1.6, Quiz
Sept 14—Sept 18	Sections 2.1 and 2.2 Quiz
Sept 21—Sept 25	Sections 2.3, 2.4 and 2.5, Quiz
Sept 28—Oct 2	Review, Test 1, Section 2.6
Oct 5—Oct 9	Sections 2.7, 3.1 and 3.2 Quiz
Oct 12—Oct 16	Sections 3.2, 3.3, 3.4, 3.5 and 3.6 Quiz
Oct 19—Oct 23	Sections 4.1, 4.2 and 4.3 Quiz
Oct 26—Oct 30	Test review, Test 2, Section 4.5
Nov 2—Nov 6	Section 4.5, 4.6 and 4.7 Quiz
Nov 9—Nov 13	Sections 5.1 and 5.2 Quiz
Nov 16—Nov 20	Sections 5.2, 5.3 and 5.4 Quiz
Nov 23—Nov 27	Section 5.3 No quiz Thanksgiving Holiday
Nov 30—Dec 4	Section 5.5 Quiz
Dec 7—Dec 11	Test Review, Test 3, Section 2.8
Dec 14	Review for Final Exam
Dec 15—19	Final Exam

Important Dates:	
28 August	- Pretest
7 September	- Labor Day, no classes
9 September	- Census Date
30 September	- Test 1
28 October	- Test 2
30 October	- Drop deadline
25—28 November	- Thanksgiving, no classes
9 December	- Test 3
15—19 December	- Final Exam Week

### EXTRA HELP

**Office Hours:** Students who need extra help in the course are encouraged to form study groups and/or come to my office hours. My office hours are open to all students in any of my classes, and operate on a first-in first-out basis. If you come to my office hours on a busy day, I will make every effort to help you in the order you arrive. Outside of office hours, I am frequently in my office; if my door is shut, knock. If I am not busy I will often help students outside of office hours.

**Mathematics Learning Center (MLC):** The Department of Mathematics provides a free tutoring service for UT Tyler students taking lower level mathematics courses (Intermediate Algebra through Calculus II) in the Mathematics Learning Center located in RBN 4021. The MLC is generally open 8am-10pm Monday through Thursday and 8am-5pm on Fridays. During these hours students have access to free tutoring, access to computers for online homework and Mathematica labs, and have a place to work on homework. Upon entering the MLC students are asked for their student ID which will be scanned for attendance and held until the student wishes to be scanned out before leaving the lab. The MLC is a place to do work related to your mathematics courses - it is not a general access lab used for surfing the internet and checking email (this will be monitored by the tutors). As such, you should expect the tutors to help you with your homework. However, this doesn't mean that they remember how to do all of the different types of problems. Sometimes it will be necessary for the tutor to ask for your book to review some material before helping you. If a tutor cannot figure something out, then they will consult with a faculty member. Occasionally things go wrong in the MLC and we need to hear about it. If you feel that you are not getting the help that you need (tutors ignoring your requests for help or refusing to help due to ignorance of a subject) or if the environment is too distracting (loud talking, someone playing music, etc), then go to your instructor or Joshua Jones (RBN 4004) to report your problem. It is especially important to remember the day and time that the incident occurred. All complaints will be kept anonymous.

#### COURSE EVALUATION

**Summary of Grading Policy:** Your grade will be determined as follows:

Pretest, Homework, and Quizzes	25%
3 In-Class Exams	15% each
Final Exam	30%

**IMPORTANT:** In order to ensure consistent grading across calculus sections, your semester grade cannot exceed your final exam grade by more than one letter grade. *Thus, if you fail the final, you can make at best a D in the course.*

**Make-ups:** Make-ups for *documented* absences that are *required* as part of a UT Tyler obligation (e.g., athletes participating in an event, participation in a debate contest, etc.) or for religious observation will be granted. For all make-ups of this type, documentation and prior notification of at least one week are required. All other make-ups will be granted only in extreme circumstances and solely at Dr. Graves's discretion.

**Pre-test:** A diagnostic pre-test will be given at the beginning of the session to determine if they have the precalculus skills needed to have a successful semester in Calculus. The pre-test will be modeled from the placement tests for both College Algebra and Trigonometry. The results of this test will be used as a self-check of departmental prerequisites and as an assessment tool. *Your pre-test will be given on 28 August.*

**Quizzes:** Expect quizzes every Friday of a week there is not a test. There will be no make-ups for quizzes for any reasons. In order to account for emergencies and unexpected absences, exactly one lowest quiz grade will be dropped.

**Exams:** There are three in-class exams held throughout the session, each of which accounts for 15% of your final grade. Exam 1 will cover Sections 1.3 — 2.6, Exam 2 will cover Sections 2.7 — 4.3 (excluding 2.8), and Exam 3 will cover Sections 4.5 — 5.5.

**IMPORTANT:** Departmental policy requires that any student earning less than 70% on the first exam work on mathematics for at least three hours per week in the Mathematics Learning Center, with no more than two (2) hours in one day counting towards those three hours. *Meeting this requirement will count as a quiz grade for students making less than 70% on the first exam.* Note that you must sign into the MLC using your ID card.

**Final Exam:** Your comprehensive final exam will be held during the week of 15 – 19 December.

**Homework:** The following list of problems are “required” problems which must be submitted at the beginning of class. These questions will be graded for correctness. Also, you must choose 10 additional problems from each section, which will be graded for completeness. It is essential in calculus to work on problems; in fact, it is the only way to learn the material; it is suggested that if you are struggling with a topic, you work extra problems. *Homework will be assigned and collected every day. Late homework will not be accepted. Homework is late if it is not on the instructor’s podium or desk when lecture begins.*

Section	Problems
1.3	4, 8, 10, 12, 16
1.4	4, 10, 20, 34, 44
1.5	4, 14, 20, 32, 36
1.6	4, 14, 20, 28, 38
2.1	2ab, 6, 14, 28, 30
2.2	2, 4, 20, 28, 34
2.3	6, 8, 16, 36, 48
2.4	4, 6, 20, 24, 42
2.5	6, 8, 18, 38, 40
2.6	6, 10, 14, 18, 28ab
2.7	4, 9, 12, 22, 36
3.1	24, 30
3.2	2, 36, 62
3.3	4, 12, 22, 29, 50
3.5	4, 16, 18, 22, 32

Section	Problems
3.6	4, 8, 26, 34, 35
4.1	2, 8, 34, 40, 46
4.2	2, 6, 12, 16, 34
4.3	2, 12, 26, 30, 36
4.5	2, 6, 8, 23, 34
4.6	See Newtons Method handout.
4.7	2, 8, 9, 10, 15, 21, 24, 26, 36, 37, 44, 46
5.1	2, 4, 5, 8, 16
5.2	4a, 10a, 16, 20, 32
5.3	6, 14, 20, 22, 30, 58
5.4	8, 12, 18, 22, 26
5.5	10, 11, 21, 22, 24, 27, 30, 32, 36, 38
2.8	

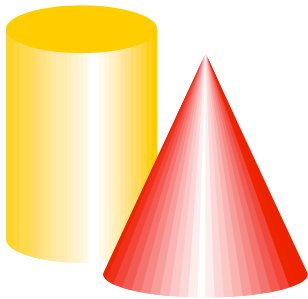
**Extra Credit:** In order to earn extra credit, you must work on mathematics for at least (3) hours per week in the MLC, with no more than two (2) hours in one day counting towards those three hours, for every week of the semester. Doing this will allow you to replace your lowest non-zero test grade with your grade on the final. Note that you must sign into the MLC using your ID card.

#### UNIVERSITY POLICIES

For University policies concerning Students’ Rights and Responsibilities, Grade Replacement/Forgiveness, State-Mandated Course Drop Policy, Disability Services, Student Absence due to Religious Observance, Student Absence for University-Sponsored Events and Activities, and the Social Security and FERPA Statement please see:

<http://www.uttyler.edu/academicaffairs/syllabuspolicies.pdf>

This course’s website: <http://www.math.uttyler.edu/sgraves>



# Add a Math Minor!

**For many majors, it only takes one additional class and a lab!**

If your major is	Requirements for your major	Courses to add a math minor
Chemistry	MATH 2413, MATH 2414, MATH 3203, MATH 3404	MATH 2113 Calculus I Lab* MATH 3425 Foundations of Mathematics
Education 4-8 Math/Science Certification	MATH 2113, MATH 2114, MATH 2413, MATH 2414, MATH 3203	MATH 3425 Foundations of Mathematics (In place of MATH 2330) One more upper level course**
Computer Science	MATH 2413, MATH 2414, MATH 3203, MATH 3351	MATH 2113 Calculus I Lab* MATH 3425 Foundations of Mathematics (In place of MATH 2330)
Civil Engineering	MATH 2413, MATH 2414, MATH 3305, MATH 3404	MATH 2113 Calculus I Lab* MATH 3425 Foundations of Mathematics
Electrical Engineering	MATH 2413, MATH 2414, MATH 3202, MATH 3305, MATH 3404	MATH 2113 Calculus I Lab* MATH 3425 Foundations of Mathematics
Mechanical Engineering	MATH 2413, MATH 2414, MATH 3305, MATH 3351, MATH 3404	MATH 2113 Calculus I Lab* MATH 3425 Foundations of Mathematics

\*Waived, if Calc I was taken at UTT before Fall 2007

\*\* Must have a total of 18 credits for minor

In general, to get a math minor, you must complete 18 credits in math, 9 of these in upper level courses. You must take MATH 2113, MATH 2413, MATH 2414, and MATH 3425. You may pick the remaining courses from among MATH 3404, MATH 3203, MATH 3305, MATH 4160, MATH 3336, MATH 3345, MATH 3351, MATH 4350, MATH 3380, MATH 4336, MATH 4341, MATH 4351, MATH 4380, MATH 4342

Contact a math advisor for more information.