Syllabus

(UTA) Math 1426 Fall 2011 Calculus One

2. Instructor Information

2.1. **Instructor.** David A. Smith

2.2. **Email.** davidsmith@uta.edu

2.3. **Office.** Pickard Hall 442

2.4. **Office Hours.** Mondays & Wednesdays: 3-4 pm and 6-7 pm. Please have your questions prepared *before you arrive* in my office. If you are not able to see me at that time, please send an email to me to schedule an appointment.

2.5. **Office Phone.** 817-272-7203

2.6. **Webpage.**
`http://www.uta.edu/faculty/dsmith/`

3. Course Information

3.1. **Course Name.** Math 1426, Calculus I

3.2. **Section Numbers.** Section 002 (Lecture), Sections 102 & 202 (Laboratories)

3.3. **Course Location.**
Lecture: Pickard Hall, Room 309.
Lab Section 102 is in Pickard Hall, Room 105.
Lab Section 202 is in Pickard Hall, Room 304.

3.4. **Course Meetings Times.** Lecture: (Section 002) MoWeFr 9:00AM - 9:50AM and Labs: (Section 102) MoWe 10:00AM - 10:50AM or (Section 203) MoWe 1:00PM - 1:50PM.

3.5. **Prerequisites.** C or better in MATH 1323 or passing score on the Math Aptitude Test.

3.6. **Required Text.** Calculus, Early Transcendentals, Custom Edition for University of Texas Arlington by Soo T. Tan

3.7. **Course Content.** We will cover the concepts of limit, continuity, differentiation and integration, as well as the applications of these concepts.

3.8. **Learning Outcomes.** Upon completion of Math 1426, the students will be able to perform various tasks including (but not limited to) those outlined below with algebraic, trigonometric and transcendental functions.

(1) Students will be able to compute the limit of various functions without the aid of a calculator.
(2) Students will be able to compute the derivatives and differentials of various functions without the aid of a calculator, and interpret certain limits as derivatives. In particular, they will be able to compute derivatives and differentials using differentiation techniques such as chain rule, implicit differentiation and logarithmic differentiation.
(3) Students will be able to find the equation of the tangent line to the graph of a function at a point by using the derivative of the function. They will be able to estimate the value of a function at a point using a tangent line near that point.
(4) Students will be able to sketch the graphs of functions by finding and using first-order and second-order critical points, extrema, and inflection points.
(5) Students will be able to solve word problems involving the rate of change of a quantity or of related quantities. Students will be able to solve optimization problems in the context of real-life situations by using differentiation and critical points of functions. The problem topics include (but are not limited to) population dynamics, finance, physics, biology, chemistry and sociology.
(6) Students will be able to compute the area below the graph of a function by using a limit of a Riemann sum and/or by using a definite integral.
(7) Students will be able to compute certain antiderivatives using various antidifferentiation techniques such as integration by substitution. They will be able to apply the Fundamental Theorems of Calculus to compute derivatives, antiderivatives, definite integrals and area.
(8) Students will be able to justify and explain their steps in problem solving. In particular, students will be able to construct correct and detailed mathematical arguments to justify their claimed solutions to problems.

3.9. **Calculator Policy.** The only calculators allowed for the homework, quizzes, midterms and final exam are TI-30XA and TI-30XIIS.

4. Student Evaluation

I anticipate that a student passing this course will spend at least 14 focused hours each week outside the classroom.

4.1. **Classroom Performance.** Attendance is required. You are expected to be on time for all class meetings. You are responsible for any and all announcements I make in class. You are responsible for any material missed during missed classes.

4.2. **Homework.** Your homework assignments will not be graded. It is your responsibility to make sure your homework is finished, on time, checked for correctness and rigor, and reviewed.

4.3. **Quizzes.** Quizzes in the form of multiple choice will be given routinely throughout the semester. There will be a minimum of 10 quizzes. Each quiz will have 5 problems and will be worth a total of 10 points. The total points earned on the quizzes (not exceeding 100) will comprise 10% of the final grade. You must bring a scantron form to every class in case of a multiple choice quiz. The scantron form is 882-E.

4.4. **Labs.** The labs (sometimes called problem solving activities) must be done in groups of size 3 or 4 students. I or my GTA will be available in the lab to answer questions, but the provided help will be more in the nature of hints or suggestions, rather than detailed explanation. These activities will require some independent thought on the part of the students. Each group will turn in only one (joint) report for a given assignment to be graded. All students must sign their name to this joint report in order to receive credit. A report turned in by a group of students of the wrong size will not be graded. There are no make-ups for labs for any reason. Your lowest lab grade will be dropped.

4.5. **Midterm Exams.** Midterm exams are departmental, i.e., all sections of Math 1426 will take the same midterm exam and the grades will have the same weight in each section. All midterm exams are comprehensive. The format of each midterm exam will be approximately half multiple-choice credit and half show-your-work credit. You are required to bring a UTA picture ID to all midterm exams. You are expected to review all quizzes, homework assignments, textbook reading notes, practice exams, class lecture notes, and previous midterms before taking a midterm exam. The scantron form is 882-E.

4.6. **Final Exam.** The final exam is also departmental. The format of the final exam will be approximately half multiple-choice credit and half show-your-work credit. You are required to bring a UTA picture ID to the final exam. *Any student who scores below 50 on the final exam cannot receive a grade higher than D in the course.* The scantron form is 882-E.

4.7. **Grade Components.**

(1) Midterm 1 is 20% of final grade.
(2) Midterm 2 is 25% of final grade.
(3) Final Exam is 35% of final grade.
(4) Labs are averaged (after the lowest one is dropped) and accounts for 10% of final grade.
(5) Quizzes are averaged (after the lowest two are dropped) and accounts for 10% of final grade.

4.8. **Grading Scale.** A cumulative score of 90% or above guarantees an A, 80% or above, at least a B, 70% or above, at least a C, and 60% or above, at least a D.

Any student who scores below 50 on the final exam cannot receive a grade higher than D in the course.

4.9. **Make-up Policy.** If you have a conflict with either midterm or final, you must contact the course coordinator no later than Census Date, by using a form attached to the coordinator's office door (PKH 448) and submitting it together with necessary documentation as indicated on the form. You may also contact the coordinator by e-mail (Krueger@uta.edu) no later than Census Date. Do not assume that your e-mail has been received if there is no response from the coordinator. If a conflict arises after Census Date, contact the coordinator immediately. Delays in submitting a make-up request may mean that your request cannot be approved. *There is no makeup for a missed lab or quiz.*

4.10. **Drop Policy.** Any student who drops the course on or before the Drop Date will receive a W. Students must contact an advisor in their major in order to drop a course.

5. Student Information

5.1. **Email.** You should have an activated MyMav account and check it regularly during the semester. You are responsible for all the information I will be sending out to your MyMav account and the announcements I make on my Web Page.

5.2. **Americans with Disabilities Act.** The University of Texas at Arlington is on record as being committed to both the spirit and letter of federal equal opportunity legislation; reference Public Law 93112 - The Rehabilitation Act of 1973 as amended. With the passage of new federal legislation entitled Americans with Disabilities Act (ADA), pursuant to section 504 of the Rehabilitation Act, there is renewed focus on providing this population with the same opportunities enjoyed by all citizens. As a faculty member, I am required by law to provide "reasonable accommodation" to students with disabilities, so as not to discriminate on the basis of that disability. Student responsibility primarily rests with informing faculty at the beginning of the semester and in providing authorized documentation through designated administrative channels.

5.3. **Academic Dishonesty.** It is the philosophy of The University of Texas at Arlington that academic dishonesty is a completely unacceptable mode of conduct and will not be tolerated in any form. All persons involved in academic dishonesty will be disciplined in accordance with University regulations and procedures. Discipline may include suspension or expulsion from the University. "Scholastic dishonesty includes but is not limited to cheating, plagiarism, collusion, the submission for credit of any work or materials that are attributable in whole or in part to another person, taking an examination for another person, any act designed to give unfair advantage to a student or the attempt to commit such acts." (Regents Rules and Regulations, Part One, Chapter IV, Section 3, Subsection 3.2, Subdivision 3.22)

5.4. **Grade Replacement and Grade Exclusion Policies.** These policies are described in detail in the University catalog and can also be founded online at `http://wweb.uta.edu/catalog/content/general/academic_regulations.aspx`. The deadline for filing a grade replacement request is Census Date.

5.5. **Student Disruption.** The University reserves the right to impose disciplinary action for an infraction of University policies. For example, engagement in conduct, alone or with others, intended to obstruct, disrupt, or interfere with, or which in fact obstructs, disrupts, or interferes with, any function or activity sponsored, authorized by or participated in by the University.

5.6. **Drop for Non-Payment of Tuition.** If you are dropped from this class for non-payment of tuition, you may secure an Enrollment Loan through the Bursar's Office.

6. Advice for Succeeding in Math 1426

- ✓ Attend and participate in every class. Regular attendance will help you immensely in learning the concepts and preparing for the exams, and it is an important part of your grade as well.
- ✓ To do well in the course, most students will need to spend at least 14 hours per week (and probably more) studying, reviewing class notes, reading the textbook, and working on homework.
- ✓ Discuss the concepts and homework regularly with your classmates and homework teams, and come to office hours to ask questions that come up as you study and prepare your homework.
- ✓ Expect to have material covered at two to three times the pace of high school. Above that, we aim for greater command of the material, especially the ability to apply what you have learned to new situations.
- ✓ Lecture time is at a premium, so it must be used efficiently. You cannot be taught everything in the classroom. It is your responsibility to learn the material.
- ✓ The instructor's job is primarily to provide a framework, with some of the particulars, to guide you in doing your learning of the concepts and methods that comprise the material of the course. It is not to program you with isolated facts and problem types nor to monitor your progress.
- ✓ You are expected to read the textbook for comprehension. It gives the detailed account of the material of the course. It also contains many examples of problems worked out, and these should be used to supplement those you see in the lecture. The textbook is not a novel, so the reading must often be slow-going and careful. However, there is the clear advantage that you can read it at your own pace. Use pencil and paper to work through the material and to fill in omitted steps.
- ✓ Think about mathematics when you are doing things such as walking or eating. You don't need to be sitting down with a pencil and paper to think about a problem. Good thinking can be done while doing something relaxing.
- ✓ If you cannot put in enough hours per week outside of class or if TV, friends, work, etc. are taking away your needed study time, then change something now so that you will be able to do well in the class. Discussing mathematics with other students (but writing up your own proofs and explanations) will help you use your time more efficiently.

7. Important Dates

- Aug 25: First Day of Classes
- Sep 05: Labor Day Holiday
- Sep 12: Census Date
- Sep 12: **Deadline for makeup requests for all exams**
- Sep 23: Midterm 1 (Friday) from 6-8 pm
- Oct 28: Midterm 2 (Friday) from 6-8 pm
- Nov 04: Last Day to Drop Classes
- Nov 24: Thanksgiving Holidays
- Nov 25: Thanksgiving Holidays
- Dec 09: Last Day of Classes
- Dec 10: Final Exam (Saturday) from 3-5:30 pm

8. Homework Assignment Sheet

The student who wishes to be successful in the course will do additional problems not on this assignment sheet.

(1) §1.1: Intuitive Introduction to Limits 1-8, 11, 17, 18, 20, 21, 22, 31, 33

(2) §1.2: Techniques for Finding Limits 23-28, 31-38, 48, 49, 55, 56, 60, 65, 68, 70, 75, 77, 86, 93, 99,100, 101

(3) §1.4: Continuous Functions 3, 4, 8, 10, 15, 16, 23, 27, 29, 34, 35, 41, 42, 49, 50, 54, 56, 59, 63, 96

(4) §1.5: Tangent Lines & Rates of Change 1, 5, 6, 9, 14, 18, 20, 22, 29, 41-44

(5) §2.1: The Derivative 4, 6, 9, 13, 17, 20, 25, 26, 27, 28, 29, 30, 33, 34, 35, 39, 44, 45, 46, 50, 51, 57, 60

(6) §2.2: Basic Rules of Differentiation 2, 7, 19, 26, 30, 32, 34, 35a, 38a, 39, 42, 57, 58, 74

(7) §2.3: The Product and Quotient Rules 1, 4, 8, 9, 14, 18, 23, 24, 28, 32, 33, 37, 45, 48, 50, 57, 61, 63, 69

(8) §2.4: The Role of the Derivative in the Real World 3, 7, 12, 16, 17, 22, 26, 33, 34

(9) §2.5: Derivatives of Trigonometric Functions 3, 6, 9, 15, 18, 19, 22, 26, 28, 32a, 33, 36, 37, 40, 43, 52

(10) §2.6: The Chain Rule 1, 3, 5, 10, 12, 17, 19, 20, 30, 43, 48, 61, 62, 63, 64, 71a, 73, 74, 78, 80, 85, 87a, 94, 111

(11) §2.7: Implicit Differentiation 5, 8, 16, 21, 26, 28, 36, 37, 42, 46, 47, 59, 65, 75, 76, 91

(12) §9.2: Plane Curves and Parametric Equations 2, 3, 7, 9, 11, 20, 23, 31, 32, 51

(13) §9.3: The Calculus of Parametric Equations 3, 4, 8, 13, 15, 18, 28, 29, 30

(14) §2.8: Derivatives of Logarithmic Functions 6, 7, 13, 18, 26, 31, 33, 34, 40, 43, 48, 54

(15) §2.9: Related Rates 3, 6, 8, 9, 14, 16, 18, 24, 25, 26, 28, 29

(16) §2.10: Differentials and Linear and Approximation 2, 3, 8, 10, 13, 19, 22, 25, 27, 30, 33, 42, 45

(17) §3.1: Extrema of Functions 1, 2, 4, 13, 16, 17, 21, 23, 26, 30, 37, 39, 42, 48, 51, 52, 59, 66, 67, 70, 79

(18) §3.2: The Mean Value Theorem: 4, 8, 11, 12, 16, 18, 20, 21, 24, 26, 27, 36, 50, 51

(19) §3.3: Increasing & Decreasing Functions & the First Derivative Test 3, 4, 6, 7, 8, 9, 14, 15, 17, 22, 27, 32, 35, 42, 43, 47, 56, 58, 59, 63, 75

(20) §3.4: Concavity and Inflection Points 2, 4, 7, 8, 9, 10, 13, 22, 27, 38, 42, 52, 53, 56, 61, 64, 66, 75

(21) §3.5: Limits Involving Infinity; Asymptotes 2, 11, 14, 21, 23, 24, 30, 35, 39, 51, 54, 56, 57, 60, 62, 68, 89

(22) §3.6: Curve Sketching 4, 9, 15, 18, 24, 26, 41, 42, 46, 50

(23) §3.7: Optimization Problems 3, 4, 8, 13, 15, 21, 28, 33, 34, 46, 57, 67

(24) §3.8: Indeterminate Forms and LHpitals Rule 2, 3, 5, 6, 10, 14, 15, 24, 31, 32, 38, 39, 49, 50, 51, 57, 58

(25) §4.1: Indefinite Integrals 7, 9, 14, 19, 21, 24, 29, 40, 41, 46, 48, 54, 58, 65, 67, 68, 70, 71, 75

(26) §4.2: Integration by Substitution 3, 4, 6, 11, 13, 17, 18, 19, 24, 29, 33, 36, 41, 47, 52, 65, 67, 76, 77, 86, 87

(27) §4.3: Area 2, 8, 15, 20, 22, 25, 29, 39, 42, 50, 52, 59

(28) §4.4: The Definite Integral 1, 4, 8, 9, 13, 16, 18, 20, 24, 27, 31, 32, 63, 64, 65, 66, 67, 70

(29) §4.5: The Fundamental Theorem of Calculus 1, 3, 7, 9, 14, 18, 19, 21, 22, 24, 31, 32, 34, 35, 43, 46, 51, 54, 57, 58, 60, 62, 69, 76, 79, 85, 93, 97, 99

(30) §4.6: Numerical Integration 1, 4, 6, 7, 21, 27, 44, 45

(31) §5.1. Areas between Curves 2, 4, 6, 9, 15, 23, 24, 26, 28, 32, 33, 34, 35, 38, 40