TEXAS A&M UNIVERSITY – Corpus Christi
Department of Mathematics and Statistics

MATH 2413.005
CALCULUS I
Spring Semester 2013

I. COURSE INFORMATION
1. Meeting Time & Place: TR 11:00 - 12:15 in IH 268
2. Professor: Dr. Pablo Tarazaga
3. Office Phone: 825-3187
4. Office Address: CI 316
5. e-mail Address: pablo.tarazaga@tamucc.edu
6. Office Hours:
   TR 9:00 - 11:00 PM
   F 9:00 - 10:00 PM
7. Lab Meeting Time & Place:
   MATH 2413.251 W 11:00 - 12:50 in CCH 206
   MATH 2413.252 R 09:00 - 10:50 in CI 223

II. COURSE DESCRIPTION
In this course we will deal with derivatives and integrals of functions in one variable. The
course begins with limits, and uses them to define the derivative of a function. Then differ-
entiation rules are discussed, followed by applications of differentiation. Finally, integrals
are introduced followed by some applications of integrals.

III. PREREQUISITES FOR THE COURSE
MATH 1314 (College Algebra) and MATH 1316 (Trigonometry), or MATH 2312 (Precal-
culus), or placement beyond MATH 2312.

IV. TEXT and OTHER SUPPLIES REQUIRED
The required textbook for the course is Calculus with Early Transcendental by James

V. STUDENT LEARNING OUTCOMES
At the end of the course the student should:
1. Understand and use the concept of the limit of a function
   a. Use properties of limits and other techniques, like L'Hôpital's rule, to determine the exis-
      tence or not of the limit of a function at a given value;
   b. Understand the definition of continuity of functions
      i. From a function given in a graph determine the discontinuity point indicating which prop-
         erties of continuity fail;
      ii. Given a piece-wise function defined by formulas determine the points at which the function
          is discontinuous.
2. Be able to provide examples and counterexamples dealing with important results discussed
   in this course, and specially to understand the necessity of the conditions for some of them:
   a. Give an example of a function which does not satisfy the Intermediate Value Theorem
      (IVT),
   b. Give an example of a function which does not satisfy the Mean Value Theorem (MVT);
c. Give an example of a discontinuous function with a removable/non-removable discontinuity;
d. Give an example of a function whose limit does not exist at a point.
e. Give an example of a function that is continuous but not differentiable at a point.
3. Understand and interpret the concept of the derivative:
a. Graphically, as the slope of the tangent line at a point;
b. Analytically, as the instantaneous rate of change of the function;
c. Use information about the first and second derivative to obtain information about the original function; interpret the units of the derivative.
d. Points where the function is increasing the fastest, where it is constant, etc.
e. From a given graph determine all the critical points and indicate at which the function is not differentiable.
f. From a function defined piecewise determine whether or not the function is differentiable at the point(s) where the pieces join.
4. Find the linear approximation of a function at a differentiable point and use it to estimate the function.
a. They will produce the linear approximation from a graph and determine if in a neighborhood of the point it will give an overestimate or underestimate
b. From a function defined by an algebraic expression the student will find the linear approximation at a given point and use it to estimate the original function. The student has to justify whether it is an overestimate or under estimate.
5. Sketch the graph of a function or its derivative function:
a. From the graph of a function, they produce the graphs of the first and second derivative functions;
b. From the graph, or information, about the first and second derivative of a function they will generate the graph of the function.
c. From a function defined by a formula they will find the information to sketch its graph (domain, continuity points, increasing/decreasing, concave up/down, end behavior, asymptotes)
6. Use calculus techniques to the solution of problems:
a. Optimization problems. Given an optimization problem the student will find the mathematical model for it, and will proceed to solve it using calculus techniques (for some they may need to use technology)
b. Related rates problems.
7. Use implicit differentiation properly:
a. Calculate derivatives using implicit differentiation
b. Determine the equation of tangent lines to graphs obtained from expressions where one variable is given implicitly as a function of other.
8. Understand the concept of the integral
a. Interpret the units of the integral in the solution of problems
b. Evaluate basic definite integrals
c. Calculate the area of regions by using integration
d. Interpret integrals as area to evaluate them
e. Estimate integrals using Riemann Sums
f. Use the Fundamental Theorem of Calculus so that the student understands the relationship between integration and differentiation.
VI. INSTRUCTIONAL METHODS AND ACTIVITIES
The class uses lecture format encouraging student participation and discussion.
The labs meetings are held in a computer laboratory and they consist of directed activities
that include Labs projects using Matlab and solving special assigned problems.

VII. EVALUATION AND GRADE ASSIGNMENT
The methods of evaluation and the criteria for grade assignments are:
The Lab part of the course is graded by the TA and counts for 20% of the course grade.
A gateway test on derivatives will be given in the lab (see the lab syllabus) to guarantee
you get the computational part of taking derivatives down. You have three attempts to
pass the gateway test, where the best attempt counts. The gateway test is paper-and-
pencil test, no calculators, computers, cell-phones of formula sheets are permitted. Use of
any non-permitted aid on any of the three attempts results in a grade of zero points for
all attempts of the gateway test. To pass the gateway test you need to have at least 70% of
the problems correct, otherwise your score is zero. The gateway test counts for 10% of
your grade.
About half a dozen of quizzes will be distributed along the course. I use them to monitor
the progress of your learning. A mid term exam will cover about the first half of the
material.
The comprehensive Final Exam (including chapter 5) is on Friday, May 8, 11:00 AM - 1:30
PM in the usual classroom.
The weights of the different parts of the course towards the final grade are:

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<tr>
<th>Component</th>
<th>Weight</th>
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<tbody>
<tr>
<td>Midterm</td>
<td>25%</td>
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<tr>
<td>Quizzes</td>
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<tr>
<td>Labs</td>
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<td>Gateway Test</td>
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<tr>
<td>Comprehensive Final Exam</td>
<td>25%</td>
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Homework will be assigned at the end of each section from the book and will be no collected.
Office hours are a great opportunity to ask more questions about homework. On-campus
free tutoring in CASA is another way of getting help with the homework.

Grading Scale: Grades will be no stricter than
A = 90.00 – 100%
B = 80.00 – 89.99%
C = 70.00 – 79.99%
D = 60.00 – 69.99%
F = below 60%
VIII. TENTATIVE COURSE SCHEDULE

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<tr>
<th>Weak</th>
<th>Sections</th>
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<tbody>
<tr>
<td>1/21</td>
<td>1.1 - 1.6</td>
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<td>1/28</td>
<td>2.1 - 2.2</td>
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<td>2/4</td>
<td>2.3 - 2.4</td>
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<td>2/11</td>
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<td>2/18</td>
<td>2.5 - 2.6</td>
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<td>2/25</td>
<td>2.7 - 2.8</td>
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<td>3/4</td>
<td>3.1 - 3.2</td>
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<td>3/11</td>
<td>Spring Break</td>
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<td>3/18</td>
<td>3.3 - 3.4</td>
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<td>3/25</td>
<td>3.5 - 3.6</td>
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<td>3.7 - 3.8</td>
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<td>4/8</td>
<td>3.9 - 3.10</td>
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<td>4/29</td>
<td>4.7 - 4.8</td>
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<td>5/6</td>
<td>4.9 - 5.1</td>
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Final Exam: May 14, 11:00 - 1:30

IX. CLASS POLICIES

Attendance will be taken each class. For most students attending class is a faster way of learning the material than trying to catch up on missed material solely from the book. Tardiness is often disruptive to the whole class and is not appreciated. If you are delayed and arrive late for class please do so quietly.

After you receive your grades you have up to a week to dispute it. I am the person you can dispute your grade with.

Cell phones and such must be turned off before class.

If you have to miss an exam, it is your responsibility to contact me no later than the day of the exam. One make-up exam will be scheduled for each exam. Make-up exams tend to be harder than the original exam. Failure to contact me on or before the exam day results in a grade of zero points for the exam. Only extreme emergencies or official university business are acceptable reasons to miss exams and documentation will be required. If your reason to miss the exam is not a valid one, your exam score is 0 points. Be sure to check before missing an exam whether your reason is acceptable.

Note about Final Exam:

Any student missing the final exam for any reason will get a score of 0. Only real documented emergencies will be considered. Notification of the emergency via e-mail or phone must be done before or during the final exam time.

X. ACADEMIC INTEGRITY/PLAGIARISM

University students are expected to conduct themselves in accordance with the highest standards of academic honesty. Academic misconduct for which a student is subject to
penalty includes all forms of cheating, such as illicit possession of examinations or examination materials, falsification, forgery, complicity or plagiarism. (Plagiarism is the presentation of the work of another as one’s own work.) In this class, academic misconduct or complicity in an act of academic misconduct on an assignment or test will result in a grade of zero for the assignment or test and will be reported to the appropriate authorities for further action.

XI. DROPPING A CLASS
I hope that you never find it necessary to drop this or any other class. However, events can sometimes occur that make dropping a course necessary or wise. Please consult with me before you decide to drop to be sure it is the best thing to do. Should dropping the course be the best course of action, you must initiate the process to drop the course by going to the Student Services Center and filling out a course drop form. Just stopping attendance and participation WILL NOT automatically result in your being dropped from the class. Friday, April 1 is the last day to drop a class with an automatic grade of "W" this term.

XII. CLASSROOM/PROFESSIONAL BEHAVIOR
Texas A&M University-Corpus Christi, as an academic community, requires that each individual respect the needs of others to study and learn in a peaceful atmosphere. Under Article III of the Student Code of Conduct, classroom behavior that interferes with either (a) the instructor’s ability to conduct the class or (b) the ability of other students to profit from the instructional program may be considered a breach of the peace and is subject to disciplinary sanction outlined in article VII of the Student Code of Conduct. Students engaging in unacceptable behavior may be instructed to leave the classroom. This prohibition applies to all instructional forums, including classrooms, electronic classrooms, labs, discussion groups, field trips, etc.

XIII. GRADE APPEALS
As stated in University Rule 13.02.99.C2, Student Grade Appeals, a student who believes that he or she has not been held to appropriate academic standards as outlined in the class syllabus, equitable evaluation procedures, or appropriate grading, may appeal the final grade given in the course. The burden of proof is upon the student to demonstrate the appropriateness of the appeal. A student with a complaint about a grade is encouraged to first discuss the matter with the instructor. For complete details, including the responsibilities of the parties involved in the process and the number of days allowed for completing the steps in the process, see University Rule 13.02.99.C2, Student Grade Appeals, and University Procedure 13.02.99.C2.01, Student Grade Appeal Procedures. These documents are accessible through the University Rules Web site at http://www.tamucc.edu/provost/university_rules/index.html. For assistance and/or guidance in the grade appeal process, students may contact the Office of Student Affairs.

XIV. DISABILITIES ACCOMMODATIONS
The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please call or visit
Disability Services at (361) 825-5816 in Driftwood 101.
If you are a returning veteran and are experiencing cognitive and/or physical access issues in the classroom or on campus, please contact the Disability Services office for assistance at (361) 825-5816.