Calculus I Math 2413  
Mathematics and Statistics Department  
Spring 2015

A. COURSE INFORMATION

Course number/section: Math2413.001  
Class meeting time: TR  8:00 - 9:15 am  
Lab M 3:30 -5:20 pm  
Class location: CS 115  
Lab CI 222  
Course Website: bb9.tamucc.edu

B. INSTRUCTOR INFORMATION

Instructor: Dr. Jose H. Giraldo  
Office location: CI 317  
Office hours: TR 12:30-2:00 pm  
W 11:00 am – 1:00 pm  
Telephone: 361-8255827  
e-mail: jose.giraldo@tamucc.edu  
Appointments: Contact me through email to arrange meetings outside office hours.

C. COURSE DESCRIPTION

Catalog Course Description  
Limits, continuity, derivatives, applications of the derivative, and an introduction to integrals.  
Contain a laboratory component. Counts as the mathematics component of the University Core Curriculum.

Extended Course Description

After reviewing the key concepts on functions, including the library of basic functions, the concept of the integral of a function on a closed interval will be discussed. Then a detailed discussion of limit of function will be tied to integrals and to the definition of continuity of a function at a point. The concept of the derivative of a continuous function at a point will be discussed from a graphical, numerical, and algebraic point of view.

Key ideas about derivatives such as local maximum/minimum, critical points, and inflection points will be discussed in great detail. Following it, we will study some applications of the derivatives. Finally, the concept of the integral and the derivative of a function will be related by the Fundamental Theorem of Calculus.

D. PREREQUISITES AND COREQUISITES

Prerequisites  
MATH 1314 and 1316, or MATH 2312, or placement beyond MATH 2312
E. REQUIRED TEXTBOOK, READINGS AND SUPPLIES

Required Textbook

You have access to the Calculus I class notes and power point presentations I have developed for this class, which will be used for class and lab discussions. Class discussions can be supplemented using any calculus textbook.

Optional Textbook(s) or Other References

Although a textbook is not required, you are expected to have access to printouts available through black board, which contain the exercises to be worked out during class and in the lab.

Supplies

A graphing calculator is required for this class. The mathematics department supports the TI-83 plus, but in general you can use any graphing calculator. I will support the TI-83 plus, and the TI-89. The TI-89 has a computer algebra system (CAS) that facilitates your work in calculus. I will use a TI-89 for all the class demonstrations.

F. STUDENT LEARNING OUTCOMES AND ASSESSMENT

By the end of the course, a student will be able to

1. Calculate and determine the existence of limits using the definition of limit, basic properties, and L’Hoppital’s Rule. Use calculations of limits to determine local and end behavior of functions.

2. Calculate derivatives of functions from the definition, by applying appropriate rules, and by using implicit and logarithmic differentiation.

3. Interpret derivatives as slopes of tangent lines and instantaneous rates of change. Relate units of a derivative to the units of the dependent and independent variable.

4. Apply derivatives of functions appropriately to: create linearization and differentials of functions; determine and apply related rates of change to solve problems; solve optimization problems; and determine geometric features of graphs of functions.

5. Determine if functions meet hypotheses of theorems and draw appropriate conclusions. Give examples and counterexamples.

6. Use Riemann sums to approximate areas and to estimate accumulations of rates.

7. Use anti-derivatives, the Fundamental Theorem of Calculus, and appropriate u du substitutions to evaluate integrals. Then interpret the results of integration as either a signed area under a curve, or as a function. 8. Recognize and determine the relationships between the graphs of a function, its derivatives and its integral.
The student should achieve the following general goals in this class:

1. Improve his attitude toward:
   - Appreciation and value of mathematics
   - The likelihood of success and satisfaction
   - Ways to learn math effectively
   - The link between math and the student’s discipline

2. Strengthen his general academic skills in:
   - Critical thinking
   - Writing
   - Giving clear verbal explanations
   - Working collaboratively
   - Assuming responsibility
   - When and how to use technology.

3. Improve his quantitative reasoning skills:
   - Ability to translate a word problem into a math statement, and back again to words.
   - Ability to form reasonable descriptions and judgments based on quantitative information.

G. INSTRUCTIONAL METHODS AND ACTIVITIES

The concepts in the course will be discussed emphasizing a graphical, numerical, algebraic, verbal, and written approach. The key to your success is that you come to class prepared to discuss the assignments.

In general each meeting is structured to have three parts:

1. Group discussion of homework or other assignments within your group, and then extended discussion to the whole class. It will be followed by an assessment of assigned homework using “voting systems” 10-15 minutes max
2. Presentation of new concepts and activities aimed to the understanding of the new concepts. 20-25 minutes
3. Work in groups on problems dealing with the new concepts discussed in class. 20-25 minutes
4. Evaluation of new concepts using “voting systems” 10 minutes

Group work and working on homework are the essential component of this class. These are the key components for you to understand the concepts and leading to your success.

Keep in mind that you CAN ONLY REMEMBER
In this course YOU will be an active participant in the learning process. *I expect you to be a scholar, not a spectator.*

You will work in groups of three or four. Research shows that students who *work* in groups tend to be more successful. From participating actively in the activities/problems assigned, you will reach the level that enables you to discuss the concepts with others, or teach those concepts to someone else.

### H. MAJOR COURSE REQUIREMENTS AND GRADING

All the activities leading to accomplishing the goals for this class will be considered for your final grade. The table below shows the instruments that will be used to determine your grade.

<table>
<thead>
<tr>
<th>ACTIVITY</th>
<th>% of FINAL GRADE</th>
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<tbody>
<tr>
<td>Mid term Assessments (5%, 8%, 12%)</td>
<td>25%</td>
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<tr>
<td>Final Exam</td>
<td>20%</td>
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<tr>
<td>Quizzes</td>
<td>5%</td>
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<tr>
<td>Homework</td>
<td>10%</td>
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<tr>
<td>Computational Proficiency (5%, 10%, 10%, 5%)</td>
<td>25%</td>
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<tr>
<td>Lab Activities</td>
<td>10%</td>
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**Midterm Assessments**

There are three assessments. Each one has two components: no calculator part and calculator part. Since the class will build on conceptual understanding and you will understand them more as we progress into the semester, the assessments will have different weights. In a sense all the assessments are cumulative.
More information and rubrics on these assessments will be available in Black Board. There will be review questions for each of the assessments based on the learning outcomes to be assessed. About 40% of the assessment questions are coming from the review questions. **Solutions to the Reviews for test have to be submitted along with the test.** All the tests will be administered during the lab period.

I will make available to students a grid with the main categories to be assessed throughout the semester so you can keep track of how well you are doing on each of them

- Graphical understanding of calculus concepts.
- Computational skills needed in calculus: limits, derivatives, integrals
- Interpretation of results obtained by using limits, derivatives.
- Application of main results from calculus and conditions to apply those results.

**FINAL EXAM**

The final exam will assess the students’ learning outcomes set for this course. Any information about the final exam will be posted on the class web site.

The final exam for Calculus I will be on Friday May 8, 2:00-4:30 pm. Location to be announced the last week of classes.

**QUIZZES**

There will be a weekly quiz during the lab period. These are formative assessments and will tell you how well you are getting the key concepts for this course. Topics and rubric for them will be available in Black Board.

**HOMEWORK**

There is homework assigned in each class either from the class handouts or from Web Work (a web management system to be used in this class). You have to have a spiral devoted only to homework. It is important that you have the spiral with the homework available for each lab and whenever you visit with me. **You need to show evidence of your work when you ask questions about homework.**

**COMPUTATIONAL PROFICIENCY**

The approach of this course emphasizes understanding of the mathematical concepts as well as computational abilities. To guarantee that you have the computational skills needed to solve the problem for this class and succeed in other classes, you will be tested on computation of:

- Basic skills needed for calculus and sketching of basic functions.
• Limits of functions defined by formulas
• Derivatives of functions defined by formulas
• Basic integrals.

However, before you can take any of these tests you need to demonstrate absolute proficiency on basic functions and the concept of dominance of functions.

All information on these assessments will be available in BB under Computational Competences.

I. COURSE CONTENT/SCHEDULE

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<tr>
<th>DATE (BY DAY OR WEEK)</th>
<th>TOPIC</th>
<th>CHAPTER(S)</th>
<th>ASSIGNMENTS</th>
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<tr>
<td></td>
<td>Introduction to logic</td>
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<td></td>
<td>Review of functions</td>
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<td></td>
<td>Introduction to integrals</td>
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<td>Limit of Sequences</td>
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<td></td>
<td>Limit of functions and continuity</td>
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<td><strong>Assessment 1</strong></td>
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<td>Average and Instantaneous Velocity</td>
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<td>The derivative at a point and the derivative function</td>
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<td>Algebra of Derivatives</td>
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<td>The second derivative</td>
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<td>Linearization</td>
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<td>Local max/min, Global max/min</td>
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<td>Chain Rule</td>
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<td>L’Hoppital’s’ rule</td>
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<td><strong>Assessment 2</strong></td>
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<td>Implicit Differentiation</td>
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<td>Related Rates</td>
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<td></td>
<td>Optimization</td>
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<td></td>
<td>Integration (revisited)</td>
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<td><strong>Assessment 3 (take home +interview)</strong></td>
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Note: Changes in this course schedule may be necessary and will be announced to the class by the Instructor. The assignments and exams shown are directly related to the Student Learning Outcomes described in Section F.

More details available in Black Board

J. **COURSE POLICIES**

**Attendance/Tardiness**
Attendance is not mandatory but I will keep track of it. The attendance to class and participation in the class discussions are paramount for you to understand the subject matter.

**Late Work and Make-up Exams**
I will not collect any late work. No makeups unless there is an extreme situation fully justified. Do not ask for exceptions.

**Extra Credit**
There is no extra credit in this class. You have plenty of opportunities to show your understanding of the material throughout different assessments.

**Cell Phone Use**
Only allowed to deal with class related issues: surveys in class, google data or info needed for a problem, et.

**Laptop Use**
You are encouraged to bring your laptop to class. However, you are expected to use it only for class related activities. Social media, mail,

**Food in Class**
No food please.

**Missed Exam**
No makeups.

**Participation**
Your participation in any class discussions is highly encouraged.

**Others**
- Use the resources you have available: your classmates, the SI leader or the mentor, the Teaching Assistant, the professor, the Center for Academic Student Achievement (CASA). All of this will lead to our main objective, which is YOUR LEARNING.
- The course requires a solid and continuous effort. Since this is a four-credit course, you are expected to devote for each hour of class between two and three hours outside the
class working on the subject. Some people need more time than others. Each individual has a different way to learn. All of us are different.

• I do expect that you come to each class prepare to talk about any assigned work and readings. One of the best ways to learn any subject and specially mathematics is by talking to others about a problem after you have read and attempted the problems on you own. Listening to a solution without attempting to solve it and struggling through the process will not benefit you very much. Be aware that reading the solutions and be able to follow the explanation does not mean that you know how to do the problem and understand all what is involved in it.

• At the beginning of each class you have the opportunity to ask questions about the homework. Use that time wisely. Remember that making a serious attempt to solve a problem and later discuss your solution or to clarify doubts is key in the learning process.

• Feel absolutely free to ask any questions. Your question will benefit you and most likely others around you. One of the driving forces of mathematics is the questioning part. Why? Why? Why? Rote memorization is not a great help here but is needed too at some point.

• Do not hesitate to contact me in case you want to discuss your performance in the class. I am here to lead your learning but you are the one responsible for it. I AM THE COACH AND YOU ARE THE PLAYER.

• After you receive s grade you have up to the next class meeting to dispute it. I am the only person you can dispute your grade with. After the two days I assume that you accepted your grade. NO EXCEPTIONS. Grades are posted on the web immediately after I return a graded paper.

• You are expected to be on time for class. Arriving late or leaving the classroom before the end of the period will be considered impolite, and rude to your classmates and professor. BE ON TIME FOR EACH MEETING. Your attendance will be monitored. The attendance sheet will be in the front of the classroom for each meeting. Make sure you check it on daily basis.

• If at any point in the semester you are considering to drop the class, talk to me before you do it. I am here to help you in your learning experience and to help you to succeed in your college career.

• The most basic rule to work as part of a group is the respect to others. I will appreciate all your effort to make it the golden rule. Refer to others with respect.

K. COLLEGE AND UNIVERSITY POLICIES

• Academic Integrity (University)
   It is expected that university students will demonstrate a high level of maturity, self-direction, and ability to manage their own affairs. Students are viewed as individuals who possess the qualities of worth, dignity, and the capacity for self-direction in personal behavior.
   See Full University Policy at http://catalog.tamucc.edu/content.php?catoid=10&navoid=313#Academic_Integrity
• **Classroom/Professional Behavior**

• **Deadline for Dropping a Course with a Grade of W (University)**
The grade of W will be assigned to any student officially dropping a course by. No student is eligible to receive a W without completing the official drop process by this deadline. Visit the Office of the University Registrar for the Course Drop Form that must submitted. After April 10, 2015 a student will not be allowed to drop a course.

• **Grade Appeals (College of Science and Engineering)**
As stated in University Procedure 13.02.99.C2.01, Student Grade Appeal Procedures, 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 Procedure 13.02.99.C2.01, Student Grade Appeal Procedures. These documents are accessible through the University Rules website at [http://www.tamucc.edu/provost/university_rules/index.html](http://www.tamucc.edu/provost/university_rules/index.html), and the College of Science and Engineering Grade Appeals webpage at [http://sci.tamucc.edu/students/GradeAppeal.html](http://sci.tamucc.edu/students/GradeAppeal.html). For assistance and/or guidance in the grade appeal process, students may contact the chair or director of the appropriate department or school, the Office of the College of Science and Engineering Dean, or the Office of the Provost.

• **Disability Services**
Disability Services (DS) is the hub for coordinating services and accommodations to ensure accessibility and utilization of all programs for all Texas A&M University-Corpus Christi students with disabilities. Our services are designed to meet the unique educational needs of enrolled students with documented permanent or temporary disabilities. DS provides intake and consultation services to students seeking to register with our office. DS reviews an individual’s documentation of disability and assesses eligibility for services and the determination of reasonable accommodations. For more information visit the Disability Services Office at 116 Corpus Christi Hall or go to [http://disabilityservices.tamucc.edu/](http://disabilityservices.tamucc.edu/)

• **Academic Honesty**
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, forgery, or plagiarism. (Plagiarism is the presentation of the work of another as one’s own work.) For the complete statement, see [http://catalog.tamucc.edu/content.php?catoid=10&navoid=313%23Academic_I](http://catalog.tamucc.edu/content.php?catoid=10&navoid=313%23Academic_I)
L. OTHER INFORMATION

GENERAL DISCLAIMER

I reserve the right to modify the information, schedule, assignments, deadlines, and course policies in this syllabus if and when necessary. I will announce such changes in a timely manner during regularly scheduled lecture periods.