I. COURSE INFORMATION

Meeting: TR 9:15-11:45 am IH 163

Professor: Dr. Jose H. Giraldo
Office Phone: (361) 825-5827
Office Address: CI 317
E-mail address: jose.giraldo@tamucc.edu
Office Hours: MR 8:00-9:00 am, or by appointment

II. COURSE DESCRIPTION

The main concepts to discuss in this class are limits of functions, continuity of a function, the derivative function along with applications, and an introduction to the integral of a function with some applications.

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 define 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.

III. PREREQUISITES

Math 1316 (Trigonometry), Math 2312 (Precalculus), or by placement test.

IV. TEXT AND OTHER SUPPLIES REQUIRED

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

Although a textbook is not required, you are expected to have access to printouts of all the workbooks, which contain the exercises to be worked out during class and in the lab.
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.

V. GOALS AND LEARNING OUTCOMES

GOALS OF THIS COURSE
The student should achieve the following general goals:

• Improve his attitude toward:
  o Appreciation and value of mathematics
  o The likelihood of success and satisfaction
  o Ways to learn math effectively
  o The link between math and the student’s discipline
• Strengthen his general academic skills in:
  o Critical thinking
  o Writing
  o Giving clear verbal explanations
  o Working collaboratively
  o Assuming responsibility
  o When and how to use technology.
• Improve his quantitative reasoning skills:
  o Ability to translate a word problem into a math statement, and back again to words.
  o Ability to form reasonable descriptions and judgments based on quantitative information.

STUDENT LEARNING OUTCOMES (SLO)

As a core class you should:

• Be able to collaborate effectively as both an effective leader and follower.
• Be able to apply mathematical concepts to new situations.
• Communicate about interdisciplinary topics verbally and in writing, via poster presentation, and via multimedia presentation.
• Use mathematical skills to analyze data
• Develop skills to translate data into appropriate visual representations (charts, graphs).
• Take personal responsibility and become a self directed college learner.
• Get along with others.
• Develop awareness of one's present and future role in the science community.
• Use technology effectively.
• Be successful.

**CONCEPTUAL LEARNING OUTCOMES**

*At the end of the course the student should be able to:*

• Calculate limits and apply the concept of limits to continuity, derivatives, and to other contexts.

• Calculate derivatives of functions in a variety of ways: from the definition, by applying rules to a standard catalog of functions, for implicitly defined functions and for related rates.

• 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. Also, find and apply linearization and differentials of functions.

• Apply derivatives to optimization of functions, determining geometric features of graphs of functions, and to sketching graphs of functions.

• Determine whether functions meet hypotheses of theorems and draw appropriate conclusions.

• Use Riemann sums to approximate areas under curves and estimate accumulations of rates. Also, find anti-derivatives and apply them to evaluate indefinite integrals and, using the Fundamental Theorem of Calculus, to evaluate definite integrals.

**VI. 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:

I. Group discussion of homework or other assignments within your group, and then extended discussion to the whole class. It will followed by an assessment of assigned homework using “voting systems” (TopHat) 10-15 minutes max

II. Presentation of new concepts and activities aimed to the understanding of the new concepts. 20-25 minutes

III. Work in groups on problems dealing with the new concepts discussed in class. 20-25 minutes

IV. Evaluation of new concepts using “voting systems” (TopHat) 10 minutes

Group work is an essential component of this class and an essential part for you to understand the concepts and 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.

The only way to learn mathematics is with and active individual work. This implies to be prepared for each class and do (and understand) as many problems as needed to reach the desired mastery of the concepts.

Don’t forget that making mistakes is crucial in any learning process!! I have never met anybody who learns without making mistakes.

**VII. EVALUATIONS AND GRADE ASSIGNMENTS**

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>Instrument</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computational Proficiency (Basic, Limits, derivatives)</td>
<td>(50,50) 10%</td>
</tr>
<tr>
<td>Lab Activities</td>
<td>100 10%</td>
</tr>
<tr>
<td>Tests (there are three midterms) 100-200-200</td>
<td>500 50%</td>
</tr>
<tr>
<td>Final Exam</td>
<td>300 30%</td>
</tr>
</tbody>
</table>

**LABORATORY**

The lab period will be devoted to discussing problems dealing with key concepts, or reinforcement of concepts discussed in class. You will be working in groups of three or four people. The lab activities will concentrate heavily on mastering assigned homework problems.

It is important for you to understand that the way you discuss the problems will help us determine your understanding of the concepts and that way we can give you proper feedback.
Submissions of any lab work will be done through Black Board

*IT IS EXPECTED THAT YOU SHOW EVIDENCE OF THE WORK ON ANY OF THE ASSIGNED PROBLEMS IN THE COURSE. BE PREPARED TO SHOW YOUR WORK WHENEVER WE ARE HAVING DISCUSSIONS. BE ORGANIZED!!!*

In addition to the grade for each the activities assigned in the lab, your participation will be assessed according to the table below

<table>
<thead>
<tr>
<th>Activity</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Attendance</td>
<td>2</td>
</tr>
<tr>
<td>2. Willingness to help others</td>
<td>2</td>
</tr>
<tr>
<td>3. Asking/Answering questions</td>
<td>2</td>
</tr>
<tr>
<td>4. Evidence of work prior to lab (WebWork, Notebook with solutions to problems)</td>
<td>4</td>
</tr>
</tbody>
</table>

**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, your computational proficiency on **limits** and **derivatives** will be assessed. The proficiency on those concepts will happen through various assessments during the semester. 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.

**TESTS**

There are three tests. Each test has two components: basics (70%) and essay type questions (30%). Since the class will build on the concepts and you will understand them more as we progress into the semester, the tests have different weights. Test I counts as 100 points, Test II and III 200 points each.

There will be review questions for each of the test based on the learning outcomes to assess. About 40% of the test consists of questions coming from the review questions. **Solutions to the Reviews for test have to be submitted along with the test.**

**Up to this point it should be clear that the work done is going to be a big piece of your assessment.**

*Your performance in the homework, participation in class and lab discussions should be a good indicator of how you will perform in the exams and the course in general.*
All the tests will be administered during the lab period. The purpose of the review is to discuss difficulties you have with the concepts involved in the assessment.

ANY QUESTIONS ABOUT GRADING SHOULD BE DONE WITHIN 48 HOURS AFTER YOU RECEIVE THE GRADE. NO EXCEPTIONS.

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.

VIII. POLICIES AND OTHER INFORMATION

- Use the resources you have available: your classmates, the STEP mentors, 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 your grades 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.
- Do not be late in the work you have to turn in. For any work to be collected this is the policy on tardiness: For your late work to be accepted you need to present an excuse to the professor. If the professor accepts to take the work, it will be graded over 80% of the initial grade. Work ahead of schedule. Do not wait for last minute surprises.
- The most basic rule to work as part of a group is to respect others. I will appreciate all your effort to make it the golden rule. Refer to others with respect.
- You are always on your honor.

**PLEASE TURN YOUR CELLULAR PHONES OFF. DO NOT DISTURB THE CLASS WITH THEM.**

**IX. TENTATIVE COURSE SCHEDULE**

The final exam for this course is on Tuesday, July 22nd. Specific time will be announced in class.

**TOPIC**

1. Introduction to logic.
5. Estimating areas. Absolute and relative areas. Use of technology to calculate absolute and relative areas.
6. Application of areas. Units. Total change of a function on a closed interval given its rate of change. Average value of a function.
7. Quantities Infinitely large, infinitely small. Introduction to sequences.
8. Notation. Sequences from basic functions (discrete domain).
   - Definition and examples of sequences positive/negative infinitely large, positive/negative infinitely small, infinitely close to a number.
10. Dominance of sequences and undetermined cases of limits of sequences
11. Activity on sequences of partial sums (integration)
12. Transformation of sequences under a function. Limit of a function at a point. Limit of functions toward infinity
13. Continuity at a point. Intermediate value theorem.
14. **Test I**
    - Instantaneous velocity. Definition of the velocity of any function at a point.
    - Derivative at a point. Why continuity is necessary for the the existence of the derivative. Definition of a critical point : graphical and algebraic.
15 Applications interpreting the concept of derivative at a point
   The derivative function. Graphical approach. Limit definition.
16 Identifying derivative functions and antiderivative function.
17 Algebra of derivatives. Critical points, and their type, algebraically.
   Linearization.
18 **TEST II**
19 The mean value theorem. Chain rule
20 Implicit Differentiation
21 Local max/min.
22 Second Derivative
23 L’Hôpital’s rule.
24 Global max/min. Optimization
**TEST III**
26 Fundamental Theorem of calculus.
   • Integration of basic functions
   • Integration by substitution.
   • Applications including area between curves

**X. 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. Look at the calendar to find the last day to drop a class with an automatic grade of “W” this term. You are allowed to have only 6 W’s during your whole program. It means, drop the class if this is in your best interest.

**XI. ACADEMIC HONESTY**

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.

**XII. DISABILITY SERVICES**

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 reasonable accommodation of their disabilities. If you believe
you have a disability requiring an accommodation, please contact the Disability Services Office at (361) 825-5816 or go to the office at Driftwood 101.

XIII. GRADE APPEALS PROCESS

- **Grade Appeals (College of Science and Engineering Version):** 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 ([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.

- **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 Corpus Christi Hall 116.

- **Notice to Veterans:** 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.

- **Statement of Academic Continuity:** In the event of an unforeseen adverse event, such as a major hurricane and classes could not be held on the campus of Texas A&M University–Corpus Christi; this course would continue through the use of Blackboard and/or email. In addition, the syllabus and class activities may be modified to allow continuation of the course. Ideally, University facilities (i.e., emails, web sites, and Blackboard) will be operational within two days of the closing of the physical campus. However, students need to make certain that the course instructor has a primary and a secondary means of contacting each student.

XIV. CLASS POLICIES

- Use the resources you have available such as your professor, the Teaching Assistant, the Tutoring and Learning Center, your class mates. 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).

- I do expect that you come to each class prepared to talk about any assigned work and readings. One of the best ways to learn any subject and specially mathematics is by talking to other people about it after you have tried the problems. Listening to a solution without trying and struggling through it 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 extremely beneficial in your 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.

- 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 YOUR COACH, YOU ARE THE PLAYER.

- After you receive your grades 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 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.

- Attendance is mandatory. If you miss more than one week of classes (2 absences) your final grade will be reduce by one full grade. **NO EXCEPTIONS.**

- Do not be late in the work you have to turn in. For any work to be collected this is the policy on tardiness: For your late work to be accepted you need to present an excuse to the professor. If the professor accepts to take the work, it will be graded over 80% of the initial grade. Work ahead of schedule. Do not wait for last minute surprises. **THERE ARE NOT EXCEPTIONS TO THE POLICY.**
disability accommodations in this class, please see me as soon as possible. Please have your accommodation letter from TAMU-CC Services for Students with Disabilities Office with you when you come to see me. If you suspect that you may have a disability (physical impairment, learning disability, psychiatric disability, etc.), please contact the Services for Students with Disabilities Office (located in Driftwood 101) at 825-5816. It is important that you contact them in a timely fashion as it may take several days to review requests and prepare accommodations.

**LIABILITY STATEMENT.** A student is responsible and has to abide by any information given in class and through the web page of the course. It may include changes on dates for tests, format of the test, and so on. Hence, if you miss class, make sure you get the information from somebody else or from the web page.

*Notice to Students with Disabilities.* Texas A&M University-Corpus Christi complies with the Americans with Disabilities Act in making reasonable accommodations for qualified students with disabilities. If you suspect that you may have a disability (physical impairment, learning disability, psychiatric disability, etc.), please contact the Services for Students with Disabilities Office, located in Driftwood 101, at 825-5816. If you need disability accommodations in this class, please see me as soon as possible.

**ACADEMIC ADVISING**
The College of Science and Technology requires that students meet with an Academic Advisor as soon as they are ready to declare a major. The Academic Advisor will set up a degree plan, which must be signed by the student, a faculty mentor, and the department chair. The College's Academic Advising Center is located in Faculty Center 178, and can be reached at 825-6094.

**MISSING FINAL EXAM.** Any student missing the final exam for any reason will get a score of zero. If you have a reason to miss the final exam, you need to apply for an Incomplete Grade (I). If the application for an incomplete grade is approved you can then take the final exam the next semester to complete your work. In those cases a grade of I will be temporarily assigned.

**Academic Integrity:** You are assumed to be familiar with, and to abide by, all TAMUCC policies and procedures, particularly the Code of Academic Integrity and the Student Code of Conduct. Students found to be in violation of any of these policies will be appropriately sanctioned.

**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.

Also, Texas A&M University-Corpus Christi has a diverse student population that represents the population of the state. Our goal is to provide you with a high quality educational experience that is free from repression. You are responsible for following the rules of the University, city, state and federal government. We expect that you will behave in a manner that is dignified, respectful and courteous to all people, regardless of sex, ethnic/racial origin, religious background, sexual orientation or disability. Behaviors that infringe on the rights of another individual will not be tolerated.