

Calculus I
MAC 2311 Section 001
Fall 2022
MWThF, 11:15am-12:05pm, 4 Credit Hours
Florida A&M University

| COURSE SYLLABUS | |
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| Course Number: MAC 2311 | Course Title: Calculus I |
| Course Credit: 4 | Course Hours: 4 |
| College: Science and Technology Department: Mathematics Prerequisites: (MAC 1105 and MAC 1114) or MAC 1147 | Required Text: <i>Calculus</i> Early transcendental Functions, By Larson- Edwards 7 edition, Cengage Learning |
| Faculty Name: | Term and Year: Fall 2022 Place and Time: BENJAMIN L.Â , BLPC 300 , MWThF, 11:15am-12:05pm Modality: Face to Face |
| Office Location: | Telephone: e-mail: |

Office Hours

| Monday | Tuesday | Wednesday | Thursday | Friday |
|---------------|----------------|------------------|-----------------|---------------|
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Course Description:

Students are expected to use their mathematical knowledge and practices to solve problems. This course strengthens students' understanding of functions in preparation for the process of differentiation and integration. Calculus concepts explored include limits and continuity, derivatives, definite integrals, exponential and logarithmic functions, trigonometric functions, and techniques of integration. Emphasis is placed on the exploration of real-world calculus applications. Students are expected to learn to choose and use appropriate mathematics and statistics to analyze empirical situations, to understand them better, and to improve decisions. for this course requires 5-6 hours

a week of independent practice such as homework, reading and projects. Graphing calculators are required.

Required Textbooks and Instructional Materials: *Calculus*, Early transcendental Functions, By Larson-Edwards

Overarching

1. Students will be able to remember, select and calculate limits, derivatives, definite and indefinite integrals.
2. Students will be able to use concepts of limits and derivatives to determine extrema,
3. Students will be able to deduce basic rules concerning limits, derivatives and anti-derivatives
4. Students will be able to interpret and apply Mean Value Theorems, Intermediate Value Property, Fundamental Theorem of Calculus and apply/explain connection between definite and indefinite integrals.

Course-level Student Learning Objectives:

| Course-level Student Learning Objectives | Level of Bloom's Taxonomy: |
|---|--|
| <p>1. Students will be able to remember, select and calculate limits, derivatives, definite and indefinite integrals.</p> <p><u>Competencies:</u></p> <ul style="list-style-type: none"> * Evaluate the limit of a function at a finite point or at infinity both algebraically using limit laws and graphically; * Use the definition of a limit to verify a value for the limit of a function; * Use the limit to determine the continuity of a function and to find the derivative of a function; * Find derivatives involving powers, exponents, sums, products and quotients, composed functions (Chain rule), logarithmic and trigonometric functions, and inverse functions; * Estimate area using Riemann sums and express the limit of a Riemann sum as a definite integral; * Evaluate the definite integral using geometry, integrate algebraic, exponential, and trigonometric functions; * Evaluate definite integrals using the Fundamental Theorem of Calculus; | <p>Remembering (retrieving information from memory: acquire, distinguish, draw, find label, list, match, read, record) and Understanding (explaining ideas or concepts: compare, find, differentiate, fill in, demonstrate, outline, predict, represent)</p> |

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| <p>* Integrate using substitution</p> | |
| <p>2. Students will be able to use concepts of limits and derivatives to determine extrema, monotonicity, concavity of functions, calculate areas and to apply these concepts to solve problems of science, finance and engineering.</p> <p><u>Competencies:</u></p> <ul style="list-style-type: none"> * Use the first derivative to find critical points; * Using the first derivative to determine the monotonicity and extrema of a function; * Using the second derivative to determine the concavity, inflection points and extrema of a function; * Sketch the graph of the function using information gathered from the first and second derivatives; * Construct and interpret graphs of functions; * Use the derivative to find velocity, acceleration, and other rates of change; * Use the derivative to find the equation of a line tangent to a curve at a given point; * Use optimization techniques in areas such as economics, the life sciences, the physical sciences, and geometry; * Solve related rates problems; * Use differentials to estimate change; | <p>Analyzing (breaking information into parts to explore understandings and relationships: classify, determine, generalize, select, survey, transform)</p> |
| <p>3. Students will be able to deduce basic rules concerning limits, derivatives and anti-derivatives</p> <p><u>Competencies:</u></p> <ul style="list-style-type: none"> * Use epsilon-delta arguments to prove limits for functions, * deduce product, quotient, chain derivation rules, as well as, expand those rules to products and chains of several functions, | <p>Creating (generating new ideas, products, or ways of viewing things: create, deduce, device, plan, rewrite, organize, present)</p> |

Commented [1]: Delete "the"

4. Students will be able to interpret and apply Mean Value Theorems, Intermediate Value Property, Fundamental Theorem of Calculus and apply/explain connection between definite and indefinite integrals.

Competencies:

- * Interpret the geometrical meaning of Rolle and Mean Value Theorems concerning derivatives;
- * Interpret the geometrical meaning of Mean Value Theorems concerning definite integral ;
- * Find area using Riemann sums and recognize limits of which expressions can be calculated using definite integrals;
- * Evaluate integrals using substitution method and argue that FTC connects two different concepts;
- * Interpret the geometrical meaning of Rolle and Mean Value Theorems concerning derivatives;
- * Argue that IVP is a consequence of continuity and show how this can be used to prove existence of some equations.

Evaluating
(argue, critique,
interpret, test, verify)

Commented [2]: What is the acronym FTC?

Measurable Student Learning Outcomes

In the study of Calculus I a student should demonstrate understanding of, and effective ability to work with, a range of skills and concepts including:

Limits

- Differentiate between the limit and the value of a function at a point o Find the limit of a function by numerical, graphical and analytic methods
- Apply Limit Laws
- Calculate one-sided limit of a function
- Prove the existence of a limit using precise definition of the limit
- Determine the continuity of a function
- Calculate Vertical and Horizontal asymptotes using limits

In Derivatives and Differentiation Rules

- Define Derivatives and Rates of Change
- Compute derivatives of basic functions using the definition of the derivative
- Differentiate polynomial, rational, radical, exponential and logarithmic functions
- Find the equation of a tangent line using derivative
- Differentiate trigonometric functions
- Apply product, quotient, chain rules
- Apply implicit differentiation and find derivatives of inverse trigonometric functions
- Apply the concept of rates of change to natural and social sciences
- Apply the concept of related rates

- Define hyperbolic functions and their derivatives
- Find linear approximation of a function at a given point
- An Applications of Differentiation
- Calculate local and absolute maximum and minimum values of a function
- Apply Rolle's Theorem and Mean Value Theorem to study properties of a function
- Find critical points, and intervals of increasing and decreasing values of a function
- Find points of inflection and intervals of different concavities
- Sketch a curve for a given function
- Apply rules of differentiation to solve optimization problems
- Find antiderivatives for basic functions using knowledge of derivatives

In Integrals

- Relate areas to definite integrals using sigma notation, Riemann Sums, and limits. [Note: L Hopital's Rule is in Calc II but may be used for instructional purposes here.]
- Apply Fundamental Theorem of Calculus to find definite integrals and derivatives
- Find indefinite integrals of polynomials and basic trigonometric and exponential function
- Apply Net Change Theorem
- Perform integration using substitution
- Find are as between curves
- Find average value of a function
- exhibiting an understanding of the gradient and its relationship to level curves and surfaces, directional derivatives and linear approximation;

Course Content:

Important Note: *This is a tentative schedule for the course, and the instructor may change it without any prior notice.* Refer to the course calendar for specific meeting dates and times. Activity and assignment details will be explained in detail within each week's corresponding learning module. If you have any questions, please contact your instructor

The Tentative Schedule for this course:

| Week | Section | Assignments | Class Activity |
|-------------------|----------|------------------------|-------------------|
| Week 1, August 22 | 2.1, 2.2 | Assignment 1: 2.1, 2.2 | Quiz 1 (2.2- 2.3) |

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| Week 2, August 29 | 2.3, 2.4 | Assignment 2: 2.3, 2.4 | Quiz2 (2.4- 2.5) |
| Week 3, Sep 5 | 2.5, September 5th (Holiday)- Labor Day | Assignment 3: 2.5 | Review Session |
| Week 4, Sep 12 | 3.1, 3.2 | Assignment 4: 3.1, 3.2 | Test 1 (2.1-2.5) |
| Week 5, Sep 19 | 3.3, 3.4 | Assignment 5: 3.3, 3.4 | Quiz 3 (3.1- 3.3) |
| Week 6, Sep 26 | 3.5, 3.6 | Assignment 6: 3.5, 3.6 | Quiz 4 (3.4- 3.8) Test 2 (3.1- 3.5) |
| Week 7, Oct 3 | 3.7, 3.8 | Assignment 7: 3.7, 3.8 | Review Session |
| Week 8, Oct 10 | 5.1, 5.2 October 10, Last Day to Apply for Graduation | Assignment 8: 5.1, 5.2 | Test 3 (3.6- 3.8) |
| Week 9, Oct 17 | 5.3, 5.4 | Assignment 9: 5.3, 5.4 | Quiz 5 (5.1- 5.3) |
| Week 10, Oct 24 | 5.5, 5.6 | Assignment 10: 5.5, 5.6 | Quiz 6 (5.4-5.5) |
| Week 11, Oct 31 | 5.7, 5.8, November 04, Last Day to Withdraw | Assignment 11: 5.7, 5.8 | Quiz 7 (5.6- 5.8) Review Session |
| Week 12, Nov 7 | 5.9, 4.1, 4.2, November 11, Holiday – University Closed in Observance of Veterans Day | Assignment 12: 5.9, 4.1, 4.2 | Test 4(5.1- 5.9) Quiz 8 (4.1- 4.3) |

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| Week 13, Nov 14 | 4.3, 4.4 | Assignment 13: 4.3, 4.4 | Quiz 9 (4.4- 4.5) |
| Week 14, Nov 21 | 4.5, 4.6, November 23-25, Holiday – University Closed in Observance of Thanksgiving | Assignment 14: 4.5, 4.6, 4.7 | Quiz 10 (4.7- 4.8) |
| Week 15, Nov 28 | 4.8, 4.7, Reviews | Assignment 15: 4.8 | Test 5 (4.1- 4.8), Review |
| Week 16 – Dec 5 | The Time and Date Will Be Announced | | Final Exam |

Course Assessment/Evaluation Methods (Examinations, Quizzes, Case Studies, Papers, Etc.);

Your course grade will be based on following:

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| Five Tests (one test will be dropped) | 42% (10.5% ea.) |
| Online Homework | 20% |
| In-class work (quizzes, clickers, etc) and projects | 20% |
| Final Exam | 15% |
| Attendance | 3% |

Course Grading Distribution Scale;

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|---|--------|
| A | 90-100 |
| B | 80-89 |
| C | 70-79 |
| D | 60-69 |
| F | 0-59 |

Required Technology

1. Computer
2. Internet connection (DSL, LAN, or cable connection desirable) to access Canvas and WebAssign
3. Web Camera

Course Structure

In CANVAS, you will access lessons, course materials, and resources. Throughout the semester, we will participate in course instruction and related activities using CANVAS and alternative Internet-based technologies.

FAMU CANVAS Access

To access this course on FAMU CANVAS you will need access to the Internet and a supported Web browser (Internet Explorer, Firefox, Safari, and Google Chrome). To ensure that you are using a supported browser and have required plug-ins please run the [Check Browser](#) from your CANVAS course.

Technical Assistance

If you need technical assistance at any time during the course or to report a problem with CANVAS you can:

- Visit the [Office of Instructional Technology](#) page
- Contact the Office of Instructional Technology at 850-599-3460 or oit@famuedu

- View [CANVAS Guides](#) to learn more about using [CANVAS](#)

Attendance & Make-Up Policy

To encourage your success in this course, attendance will be taken for each class meeting. In an effort to help students succeed, the University has adopted a policy that at four unexcused absences, a student can receive a Final Grade of F for this course. Quizzes and tests are a major factor in students' final grades. Quiz and test questions come from material covered during classroom instruction. If you are absent from class, you need to get and learn the material covered in that class as soon as possible. You want to understand it before the next quiz or test to improve your performance on that quiz or test. Also, if you do not review that material, it may be more difficult for you to understand material covered in subsequent classes.

Homework, quizzes, and other assignments (in class as well as online) must be taken or submitted as scheduled. They are unable to be made-up or turned in thereafter. Make-up of a missed test will, however, be considered and may be allowed at my discretion if you provide me) a university approved excuse within five business days (one week) of your absence. Due to time constraints, however, you will not be able to make up the final examination at the end of the semester.

Dates of Unit Tests and quizzes will be announced in advance (provided students are coming to class prepared). It is the responsibility of any student who must be absent from any class because of a university event (athletic event, etc.) or a college activity (job interview, etc.) to inform your Instructor as soon as you are aware of the event or activity. Official notice of the dates of these events is generally available well in advance of the dates. In order to be excused from unit tests on those dates, official documentation is required. All efforts are made by the Instructor to set Unit Test dates that do not conflict with these events.

WebAssign Access:

Some quizzes and homework are available on Webassign. In order to have access you need the following Information;

Website: <https://www.webassign.net/wa-auth/login>

Name of the Course:

Class Key:

Tests:

There will be four tests, Test 1 (Limits and Continuity), Test 2 (Differentiation), Test 3 (Differentiation), Test 4 (Integration), Test 5 (Applications of Derivatives) during the semester and a comprehensive final at the end of the semester. There is no make-up for Final Exam.

Quizzes & Required Reading:

Required readings will be assigned and due at the beginning of the appropriate class meeting. In order to provide incentive for students to complete these readings beforehand, random "pop" quizzes will be administered. These quizzes are designed to simply assess whether students have read the material and are NOT meant to test their conceptual understanding of the content. The instructor reserves the right to administer conventional "announced" quizzes as well. There are no make-up's for missed quizzes whether in class or online.

Online Homework and Quizzes: It is the student's responsibility to have access code for Webassign to start working on the online Reading Assignment, Homework and Quizzes on time. No request for extension of due date will be honored.

Conflict Resolution

Procedure for resolving faculty-student Conflict

- a) Student first attempts to resolve issue with instructor.
- b) Student submits written notification of problem to department chair.
- c) Chair forwards student letter to instructor.
- d) Instructor responds in writing to chair.
- e) Chair meets with instructor and/or student if necessary.
- f) Chair forwards response/recommendation to Dean's office.
- g) Dean decides what further course of action is available to the student.

College of Science & Technology Grievance Deadlines /Intent to Grieve Form

Students must submit Intent to Grieve Forms, online, within two weeks of grades being made available for students to view in accordance with the University Registrar's calendar. Students cannot submit an Academic Grade Grievance without submitting an Intent to Grieve Form unless they receive an exception from the Academic Dean.

Grievances submitted to the College of Science and Technology Grievance Committee for Fall Semester grade disputes must be communicated to the College of Science and Technology Dean's office by the deadlines listed below. These will only be reviewed if an Intent to Grieve Form was filed by the stated deadline or an exception is provided by the Associate Dean allowing the student to submit a grievance without filing an Intent to Grieve Form.

Biology, Chemistry, Math, Physics courses—student must submit the grievance no later than March 1st (or next business day).

CIS courses- No later than three weeks after the student receives notification of the outcome of the Academic Complaint Process from the CIS chairperson.

Weekly Schedule

Read notes for upcoming week's instruction and sections in textbook (see pacing guide), bring notes to class instruction, take handwritten notes during instruction, and review your notes after class.

Additional Free Tutoring

The university provides on demand tutoring after hours and on evenings/weekends through tutor.com. To logon to the service logon to Canvas, go to Tools on the left-hand menu, and look for the Tutor.com link. Then follow the on-screen instructions.

Policy Statement on Non-Discrimination

It is the policy of Florida Agricultural and Mechanical University to assure that each member of the University community be permitted to work or attend classes in an environment free from any form of discrimination including race, religion, color, age, disability, sex, marital status, national origin, veteran status and sexual harassment as prohibited by state and federal statutes. This shall include applicants for admission to the University and employment.

Academic Honor Policy Statement

Florida A&M University is committed to academic honesty and its core values, which include scholarship, excellence, accountability, integrity, fairness, respect, and ethics. These core values are integrated into this academic honesty policy. Being unaware of the Academic Honesty Policy is not a defense for violations of academic honesty. Additional detail on FAMU Academic Honesty Violations are provided in University Policy 2.012 (10.) (s). If you have any questions, please see your Academic Advisor.

University Americans with Disabilities Act (ADA) Statement

The Florida A&M University Americans with Disabilities Act (ADA) Policy Statement states that "Individuals who need a reasonable accommodation must notify the Office of Equal Opportunity Programs at 599-3076." It is the responsibility of the FAMU Equal Opportunity Programs (EOP) Office, through the ADA Coordinator, to ensure the Florida A&M University is in compliance with the Americans with Disabilities Act. If you have any questions, please contact your Academic Advisor or the University EOP Officer, Equal Opportunity Programs, 674 Gamble Street, Tallahassee, FL 32307, (850) 599-3076.

Disclaimer: This syllabus is intended to provide student guidance on the type of content and activities that will be covered in this course throughout the semester. It will be followed to the extent possible. However, modifications may be made to supplement and/or enhance student learning.