

Florida Agricultural and Mechanical University

Professional Education Unit
Tallahassee, Florida 32307



COURSE SYLLABUS

Course Number: MAC 2311	Course Title: CALCULUS I
Prerequisite(s): MAC 1105 and MAC 1114; or MAC 1147	
Course Credit: 4	Course Hours: Lecture 4 hours
College: Arts & Sciences	Required Text(s): Thomas' <i>Calculus</i> by Weir, Hass
Department: Mathematics	Supplies: web access to www.MyMathLab.com for homework, quizzes
Faculty Name: Dr. Ajith Gunaratne	Term and Year: Spring 2009
	Place and Time:
Office Location: Jackson-Davis Hall, 108	Telephone: (850) 599-8568 e-mail: ajith.gunaratne@famu.edu

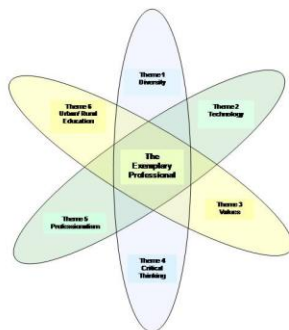
Office Hours	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday

Course Description

This course is designed to assist students in developing skills for solving problems that include limits and continuity, differentiation, and introduction to integration. In addition, students will investigate the application of derivatives and hyperbolic functions.

Conceptual Framework

The Conceptual Framework in the Professional Education Unit (PEU) at Florida A&M University is an integrated approach to providing educational experiences that result in exemplary professional educators. The Framework is comprised of six themes with the mission of developing high quality classroom teachers, administrators and support personnel. The term “exemplary” refers to the kind of graduates the PEU strives to produce. The figure below provides a diagram of the Exemplary Professional Conceptual Framework:



F=Florida Educator Accomplished Practices Standards (FEAPS)

I=Interstate New Teacher Assessment and Support Consortium Standards (INTASC)

(K)=Knowledge **(S)**=Skill **(D)**=Disposition

TECHNOLOGY

•CF 2

•Through this focal area, the FAMU professional education candidate will:

CF: 2.1 (S)	Use of available technology and software to support student learning.	F: 4,12	I: 6
CF: 2.3 (K)	Know fundamental concepts in technology.	F: 12	I: 1,6
CF: 2.4 (K)	Understand fundamental concepts in technology.	F: 2,12	I: 6
CF: 2.5 (S)	Use fundamental concepts in technology.	F: 12	I: 6

CRITICAL THINKING

•CF4

•Through this focal area, the FAMU professional education candidate will:

CF: 4.1 (K)	Understand a variety of instructional/professional strategies to encourage student development of critical thinking and performance.	F:4,7	I: 4
CF: 4.4 (K)	Acquire performance assessment techniques and strategies that measure higher order thinking skills of student.	F:1,4	I: 1,8
CF: 4.5 (S)	Demonstrate the use of higher order thinking skills.	F: 8	I: 4

PROFESSIONALISM

• CF 5

• Through this focal area, the FAMU professional education candidate will:

CF: 5.1 (K)	Know the content	F: 8	I: 1
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Overall Goals of the Course

The overall goals of the course are to develop the ability of the student to become competent in differential calculus, to develop problem solving techniques and be able to formulate verbal descriptions as mathematical problems, and to develop the ability to write well-organized, coherent, multi-step solutions to problems. The students will also know basic differentiation formulas and rules and be adept at computing derivatives of elementary functions, understand the concept of definite integral, especially as representing area under the curve and be able to approximate a definite integral by Riemann sums, and know the Fundamental Theorem of Calculus.

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In addition, the students are to become competent in differential calculus, know basic differentiation formulas and rules and be adept at computing derivatives of elementary functions, and understand the concept of definite integral, especially as representing area under the curve and be able to approximate a definite integral by Riemann sums. Know the Fundamental Theorem of Calculus.

Specific Behavioral Objectives

To successfully complete Calculus I, the student will be required to meet the following objectives with at least 70% proficiency. At the end of the course the student will be able to:

1. Evaluate limits involving polynomials, rational expressions, trigonometric expressions, and expressions involving radicals including indeterminate forms and using L'Hopital's Rule
2. State the definition of continuity at a point and use well know continuity theorems determine the derivative of any function, including polynomials, trigonometric functions, hyperbolic functions, logarithmic functions, and exponential
3. Evaluate limits involving polynomials, rational expressions, trigonometric expressions, and expressions involving radicals including indeterminate forms and using L'Hopital's Rule
4. State the definition of continuity at a point and use well know continuity theorems
5. Determine the derivative of any function, including polynomials, trigonometric functions, hyperbolic functions, logarithmic functions, and exponential functions, using the power rule, product rule, quotient rule, chain rule, logarithmic differentiation, and implicit differentiation;
6. Determine the absolute extrema and local extrema of a function, critical points and intervals where the function is increasing and decreasing .
7. Determine the concavity of function and the inflection points of a function.
8. Evaluate applied minimum and maximum problems
9. Estimate with finite sums
10. Solve problems using sigma notation
11. State and use the definition of the definite integral
12. Know Fundamental Theorem of Calculus
13. Evaluate indefinite integrals and the Substitution Rule
14. Know and solve problems involving Hyperbolic Functions

National and State Standards Addressed in the Course

Interstate New Teacher Assessment and Support Consortium (INTASC) Standards

Standard 1: Subject Matter

The teacher understands the central concepts, tools of inquiry, and structures of the discipline(s) he or she teaches and can create learning experiences that make these aspects of subject matter meaningful for students.

Standard 6: Communication

The teacher uses knowledge of effective verbal, nonverbal, and media communication techniques to foster active inquiry, collaboration, and supportive interaction in the classroom.

Standard 8: Assessment

The teacher understands and uses formal and informal assessment strategies to evaluate and ensure the continuous intellectual, social and physical development of the learner.

Professional Organization/Learned Society Standards

NCATE/NCTM Program Standards for Secondary Mathematics:

Standard 1: Knowledge of Mathematical Problem Solving

Candidates know, understand, and apply the process of mathematical problem solving.

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Standard 3: Knowledge of Mathematical Communication

Candidates communicate their mathematical thinking orally and in writing to peers, faculty, and others.

Standard 4: Knowledge of Mathematical Connections

Candidates recognize, use, and make connections between and among mathematical ideas and in contexts outside mathematics to build mathematical understanding.

Standard 5: Knowledge of Mathematical Representation

Candidates use varied representations of mathematical ideas to support and deepen students' mathematical understanding.

Standard 6: Knowledge of Technology

Candidates embrace technology as an essential tool for teaching and learning mathematics.

Standard 9: Knowledge of Number and Operation

Candidates demonstrate computational proficiency, including a conceptual understanding of numbers, ways of representing number, relationships among number and number systems, and meanings of operations.

Standard 12: Knowledge of Calculus

Candidates demonstrate a conceptual understanding of limit, continuity, differentiation, and integration and a thorough background in the techniques and application of the calculus.

Florida Educator Accomplished Practices (FEAPs)**ASSESSMENT**

The preprofessional teacher collects and uses data gathered from a variety of sources. These sources include both traditional and alternate assessment strategies. Furthermore, the teacher can identify and match the students' instructional plans with their cognitive, social, linguistic, cultural, emotional, and physical needs.

COMMUNICATION

The preprofessional teacher recognizes the need for effective communication in the classroom and is in the process of acquiring techniques which she/he will use in the classroom.

CRITICAL THINKING

The preprofessional teacher is acquiring performance assessment techniques and strategies that measure higher order thinking skills in students and is building a repertoire of realistic projects and problem-solving activities designed to assist all students in demonstrating their ability to think creatively.

KNOWLEDGE OF SUBJECT MATTER

The preprofessional teacher has a basic understanding of the subject field and is beginning to understand that the subject is linked to other disciplines and can be applied to real-world integrated settings. The teacher's repertoire of teaching skills includes a variety of means to assist student acquisition of new knowledge and skills using that knowledge.

TECHNOLOGY

The preprofessional teacher uses technology as available at the school site and as appropriate to the learner. She/he provides students with opportunities to actively use technology and facilitates access to the use of electronic resources. The teacher also uses technology to manage, evaluate, and improve instruction.

Florida Teacher Certification Examination (FTCE) Subject Area Examination (SAE) Competencies and Skills

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9 Knowledge of calculus

1. Solve problems using the limit theorems concerning sums, products, and quotients of functions.
2. Find the derivatives of algebraic, trigonometric, exponential, and logarithmic functions.
3. Find the derivative of the sum, product, quotient, or the composition of functions.
4. Identify and apply definitions of the derivative of a function.
5. Use the derivative to find the slope of a curve at a point.
6. Find the equation of a tangent line or a normal line at a point on a curve.
7. Determine if a function is increasing or decreasing by using the first derivative in a given interval.
8. Find relative and absolute maxima and minima.
9. Find intervals on a curve where the curve is concave up or concave down.
10. Identify points of inflection.
11. Solve problems using velocity and acceleration of a particle moving along a line.
12. Solve problems using instantaneous rates of change and related rates of change, such as growth and decay.

11 Knowledge of mathematics as communication

1. Identify statements that correctly communicate mathematical definitions or concepts.
2. Interpret written presentations of mathematics.
3. Select or interpret appropriate concrete examples, pictorial illustrations, and symbolic representations in developing mathematical concepts.

13 Knowledge of mathematical connections 1. Identify equivalent representations of the same concept or procedure (e.g., graphical, algebraic, verbal, numeric).

Assignment	Behavioral objectives	INTASC Standards	Professional Organization	FEAPs	FTCE SAE	PEU Conceptual Framework
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Mathematical Problem Set (Class Work 1)	Solve problems using the limit theorems concerning sums, products, and quotients of functions	INTASC: 1.0, 8.0	NCTM: 1.1, 1.3, 3.2, 4.1, 12.1	FEAPs: 1.1, 4.1, 4.1a, 4.1d, 4.1g, 8.1, 8.1a, 8.1b	FTCE: 9.1, 11.1, 11.2, 12.1	CF 4.1, CF 4.3, CF 4.5, CF 5.1
Mathematical Problem Set (Class Work 2)	Find relative and absolute maxima and minima	INTASC: 1.0, 8.0	NCTM: 1.1, 1.3, 3.2, 4.1, 12.1	FEAPs: 1.1, 4.1, 4.1a, 4.1d, 4.1g, 8.1, 8.1a, 8.1b	FTCE: 9.1, 9.8, 11.1, 11.2, 12.1	CF 4.1, CF 4.3, CF 4.5, CF 5.1
Mathematical Problem Set (Class Work 6)	Find the derivatives of algebraic, trigonometric, exponential, and logarithmic functions	INTASC: 1.0, 8.0	NCTM: 1.1, 1.3, 3.2, 4.1, 12.1	FEAPs: 1.1, 4.1, 4.1a, 4.1d, 4.1g, 8.1, 8.1a, 8.1b	FTCE: 9.2, 9.3, 9.4, 11.1, 11.2, 12.1	CF 4.1, CF 4.3, CF 4.5, CF 5.1

Teaching Methods

Teaching method will be lecture.

Course Evaluation

Your course grade will be:

Four Tests (no test will be drop) : 50%

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CourseCompass Homework	:	10%
CourseCompass Quizzes	:	10%
Class work including quizzes	:	10%
Final Examination	:	20%

Grading

A	:	100-90
B	:	90-80
C	:	80-70
D	:	70-60
F	:	60-00

Course Policies

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 The University's Academic Honor Policy is located in the FANG Student Handbook, under the Student Code of Conduct- Regulation 2.012 section, beginning on page 55-56.

ADA Compliance To comply with the provisions of the Americans with Disabilities Act (ADA), please advise instructor of accommodations required to insure participation in this course. Documentation of disability is required and should be submitted to the Learning Development and Evaluation Center (LDEC). For additional information please contact the LDEC at (850) 599-3180.

References

Weir, M. D., Hass, J., & Giordano, F. R. (2006). *Thomas' Calculus*. Boston: Pearson.

www.coursecompass.com

www.ncate.org

www.fldoe.org

Tentative Course Calendar

<i>Sections</i>	<i>Mon</i>	<i>Tue</i>	<i>Wed</i>	<i>Thu</i>	<i>Fri</i>
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week 1	2.2 - 2.4		6-Jan	7-Jan	8-Jan	9-Jan		
week 2	2.5 - 2.6		12-Jan	13-Jan	14-Jan	15-Jan	16-Jan	
week 3	2.7 - 3.1	M. L. King, Jr.	20-Jan	21-Jan	22-Jan	23-Jan		
week 4	3.2 - 3.4	Test 1	26-Jan	27-Jan	28-Jan	29-Jan	30-Jan	
week 5	3.5 - 3.6		2-Feb	3-Feb	4-Feb	5-Feb	6-Feb	
week 6	3.7 - 3.8		9-Feb	10-Feb	11-Feb	12-Feb	13-Feb	
week 7	3.9 - 3.10	Test 2	16-Feb	17-Feb	18-Feb	19-Feb	20-Feb	
week 8	4.1 - 4.3		23-Feb	24-Feb	25-Feb	26-Feb	27-Feb	
week 9	4.4 - 4.5		2-Mar	3-Mar	4-Mar	5-Mar	6-Mar	
week 10	4.5 - 4.6	BREAK	BREAK	BREAK	BREAK	BREAK		
week 11	4.8 - 5.1	Test 3	16-Mar	17-Mar	18-Mar	19-Mar	20-Mar	
week 12	5.2 - 5.3		23-Mar	24-Mar	25-Mar	26-Mar	Last Day "W"	27-Mar
week 13	5.4 - 5.5		30-Mar	31-Mar	1-Apr	2-Apr	3-Apr	
week 14	5.5 - 5.6		6-Apr	7-Apr	8-Apr	9-Apr	10-Apr	
week 15	7.4	Test 4	Apr 13	14-Apr	15-Apr	16-Apr	17-Apr	
week 16			20-Apr	21-Apr	22-Apr	23-Apr	24-Apr	
		F	I	N	A	Ls		

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Approved/Revised 10/30/07