

## FLORIDA STATE COLLEGE AT JACKSONVILLE

## COLLEGE CREDIT COURSE OUTLINE

COURSE NUMBER: MAC 2311

COURSE TITLE: Calculus with Analytic Geometry I

PREREQUISITE(S): MAC 1140 and MAC 1114 with grades of "C" or better; or  
MAC 1147 with a "C" or better.

COREQUISITE(S): None

CREDIT HOURS: 4

CONTACT HOURS/WEEK: 4

CONTACT HOUR BREAKDOWN:

Lecture/Discussion: 4

Laboratory:

Other \_\_\_\_\_:

FACULTY WORKLOAD POINTS: 4

STANDARDIZED CLASS SIZE ALLOCATION: 25

## CATALOG COURSE DESCRIPTION:

This course is designed for students who plan to major in mathematics, science, engineering, computer sciences, or any other field that requires the study of calculus. It is the first course of a three-course calculus sequence. The major topics in this course are limits and continuity, differentiation of algebraic, trigonometric, and transcendental functions, applications of the derivative, anti-differentiation, introduction to definite integration, and applications of the definite integral.

SUGGESTED TEXT(S): Calculus, Early Transcendental Functions, Latest Edition,  
Larson et al. ISBN 0-618-60624-6.

IMPLEMENTATION DATE: November 16, 1987

REVIEW OR MODIFICATION DATE: Fall Term, 2000  
Fall Term, 2001  
Fall Term, 2002 (20031)  
Spring Term, 2005 (20052)  
Fall Term, 2008 (20091) - Outline Review 2007

COURSE TOPICS	CONTACT HOURS <u>PER TOPIC</u>
I. Optional review of Precalculus topics	2
II. Limits	10
III. Derivatives	16
A. Polynomial functions	
B. Rational functions	
C. Trigonometric functions	
D. Exponential functions	
E. Logarithmic functions	
F. Logarithmic differentiation	
G. Implicit differentiation	
H. Higher order derivatives	
IV. Applications of derivatives	15
A. Instantaneous Rate of Change	
B. Applications to Velocity and Acceleration	
C. Extrema and applications	
D. Related rates	
E. Rolle's theorem and the Mean Value Theorem	
F. Concavity and points of inflection	
G. Curve sketching	
H. Differentials	
V. Basic Integration	15
A. Antidifferentiation	
B. The indefinite integral	
C. Fundamental Theorem of Calculus	
D. Numerical integration	
E. Simple substitution	
VI. Applications of integration - Area between curves	2



**Florida State College  
At Jacksonville**

**Course Learning Outcomes & Assessment  
For All College Credit Courses**

*NOTE: Use either the Tab key or mouse click to move from field to field. The box will expand to accommodate your entry.*

Section 1 COURSE PREFIX AND NUMBER: <u>MAC 2311</u>	SEMESTER CREDIT HOURS: <u>4</u>
COURSE TITLE: <u>Calculus with Analytic Geometry I</u>	

Section 2  
TYPE OF COURSE: (Click on the box to check all that apply)

<input type="checkbox"/> AA Elective	<input type="checkbox"/> AS Required Professional Course	<input type="checkbox"/> College Prep
<input type="checkbox"/> AS Professional Elective	<input type="checkbox"/> AAS Required Professional Course	<input type="checkbox"/> Technical Certificate
<input type="checkbox"/> Other _____		
<input checked="" type="checkbox"/> <b>General Education: (For General Education courses, you must also complete Section 3 and Section 7)</b>		

Section 3 (If applicable)  
INDICATE BELOW THE DISCIPLINE AREA FOR GENERAL EDUCATION COURSES:

<input type="checkbox"/> Communication	<input type="checkbox"/> Social & Behavioral Sciences	<input checked="" type="checkbox"/> Mathematics
<input type="checkbox"/> Natural Sciences	<input type="checkbox"/> Humanities	

Section 4  
INTELLECTUAL COMPETENCIES:

<input type="checkbox"/> Reading	<input type="checkbox"/> Speaking	<input type="checkbox"/> Critical Analysis	<input checked="" type="checkbox"/> Quantitative Skills	<input type="checkbox"/> Scientific Method of Inquiry
<input type="checkbox"/> Writing	<input type="checkbox"/> Listening	<input type="checkbox"/> Information Literacy	<input type="checkbox"/> Ethical Judgment	<input type="checkbox"/> Working Collaboratively

	LEARNING OUTCOMES	METHOD OF ASSESSMENT
•	An appreciation of mathematics	Students will show an appreciation of mathematics through homework, instructor observation, class discussions and assignments, and frequent exams.
•	Confidence in abilities to learn and use mathematics	Students will show more confidence in their abilities in mathematics through homework, instructor observation, class discussions and assignments, and frequent exams.
•	A positive attitude towards mathematics	Students will demonstrate a positive attitude toward mathematics on homework, instructor observation, class discussions and assignments, and frequent exams.
•	Critical thinking skills	Students will demonstrate critical thinking skills by solving problems on homework, instructor observation, class discussions and assignments, and frequent exams.
•	The successful student has reliably demonstrated the ability to:	
•	Evaluate limits involving finite and infinite values	
•	Calculate the derivative of functions using the definition of derivative	

Section 5 (Continued)

•	Demonstrate competency using power rule, product rule, chain rule and quotient rule for calculating derivatives	
•	Calculate derivatives of polynomial, rational, trigonometric and transcendental functions	
•	Demonstrate confidence using implicit and logarithmic differentiation	
•	Calculate higher order derivatives of polynomial, rational, trigonometric and transcendental functions	
•	Calculate extreme values of functions using the first and second derivative tests	
•	Calculate critical points of functions using the first derivative	
•	Solve related rates problems using derivative techniques	
•	Demonstrate an understanding of Rolle's Theorem and the Mean Value Theorem	
•	Calculate concavity and points of inflection of functions	
•	Draw accurate graphs of functions using information gathered from the first and second derivative, x and y intercepts, and a table of values	
•	Use differentials to linearly approximate values of functions near known values	
•	Demonstrate understanding of calculation of antiderivatives	
•	Demonstrate understanding of using indefinite integrals	
•	Demonstrate understanding of the Fundamental Theorem of Calculus	
•	Use numerical methods to approximate the area under curves, including Riemann sums, the Trapezoid Rule, and Simpson's Rule	
•	Use simple substitution methods to calculate antiderivatives and definite integrals	
•	Use definite integrals to find the area between curves	

**Section 6**

Name of People Completing This Form: Alfred K. Mulzet, Co-Chair, Matthew Mitchell, Co-Chair, Nick Belloit, Anne Landry, Paula Risko

**SECTION 7 MUST BE COMPLETED FOR ALL GENERAL EDUCATION COURSES.**

<i>Section 7</i>	<i>Primary</i>	<i>Secondary</i>	<i>N/A</i>		<i>Primary</i>	<i>Secondary</i>	<i>N/A</i>
KNOWLEDGE				VALUE			
A. Global and Historical Knowledge & Understanding	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Intellectual honesty	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Comprehends a general knowledge of the nature, origins and contributions of major civilizations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Curiosity and openness to new ideas	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Comprehends the workings and interrelations of personal, business and government economies	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Recognition of one's own creative potential	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Comprehends political, social and economic systems and their effects upon society	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Acceptance of and respect for differences among people and cultures	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B. Cultural and Aesthetic Knowledge and Understanding	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
• Comprehends the contributions of the arts and humanities to the human experience on a personal, national or global level	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Civic Engagement	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Comprehends the historical development of the arts and sciences	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Lifelong Learning	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Comprehends religious and cultural systems and their effects upon society	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
C. Human Awareness and Understanding	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
• Comprehends the dynamics of human behavior and the process of increasing self-awareness, growth and development	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
• Comprehends the stages of human development and the dynamics of human relationships in diverse cultures	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
• Comprehends the factors that promote physical, mental and social well-being	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
D. Mathematics, Science and Technology	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
• Comprehends the basic concepts and investigative processes of the natural sciences	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>				
• Comprehends the breadth, significance and development of the mathematical sciences	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
• Comprehends the ways science and technology have shaped and continue to reshape human cultures and the environment	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>				