

Virginia State University
School of Engineering, Science, and Technology
Department of Mathematics and Computer Science
Course Syllabus: MATH 201 - Calculus II
Spring 2009

Instructor name:

Office:

Phone number: (804)-

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Section:

Course Meeting Days, Time & Place:

Instructor's Scheduled Office Hours:

Monday	Tuesday	Wednesday	Thursday	Friday

Course Description

Math 201 (3 semester credit hours) is the second semester of a four semester sequence of Calculus for students majoring in mathematics and natural sciences. Students are expected to learn the following topics: Definite and Indefinite Integrals, Fundamental Theorem of Calculus, Areas, Volumes, Integration Techniques (substitution, Parts, Partial fractions and Trig. substitution), Areas between curves, Transcendental functions and their Inverses, Hyperbolic Functions, Integration of Logarithmic and Exponential Functions.

Prerequisite

Math 200-Calculus I (For all Math & CS majors, you should have at least a C- grade in Math 200)

- **Textbook and Resources:** *Calculus* by James Stewart, 6th Edition, 2008, Thomson Brooks/Cole.
- **Calculators:** TI-83 or higher
- **Computer Software:** Mathematica, Maple, or Matlab, can be used.

Course Requirements

1. Attend class regularly and on time, **coming late or leaving early should be avoided.**
2. **Eating and drinking are not permitted in the classroom.**
3. **Phones and pagers are to be turned off during class or put on vibration.**
4. Turn in written home assignments by the due date.
5. Purchase and read the required texts, related materials, and learn to effectively use a TI-83/84/89/92 graphing calculator
6. Participate actively in class problem solving exercises.
7. Students who are covered under the American Disability Act should privately inform the teacher of this fact so that appropriate instructional arrangements can be made.
8. All university policies specified in the Student Handbook regarding cheating, plagiarism, absenteeism, etc., will be strictly enforced. (See attached sheet on University Policies).

Learning Outcomes and Evaluation Procedure:

Knowledge

The student will:

1. Know the definition of the antiderivative of a function $f(x)$ and how to find a particular antiderivative.
2. Use indefinite integral notation.
3. Know how to define the definite integral using sigma notation
4. Define the antiderivative of the velocity and acceleration function.
5. know the area under a curve

6. Know the laws of integrations and how to integrate a function using geometric techniques.
7. State the Fundamental Theorem of Calculus.
8. Know the formula for the average value over an interval $[a, b]$.
9. Calculate the area between two given curves.
10. Define the arc length of a curve $f(x)$ between $x = a$ and $x = b$.
11. Recall the properties of $\ln x$ and e^x . Also know the formula for their derivatives and integrals.
12. Recall the derivatives of all six Trigonometric functions and know the integrals of these functions.
13. Know the formula of the integration by parts, and the indefinite integral form.
14. Recognize the definition of integrals of certain trigonometric functions and rational functions.

Skills

1. Find an antiderivative of a function using the basic rules of integration.
2. Write or re-express a sum using the sigma notation.
3. Approximate the area under a curve by partitioning the interval $[a, b]$ into n subintervals of equal length.
4. Show or confirm the area under a given curve, given a function on interval and a value A using the Mean Value Theorem.
5. Calculate the definite integral using definitions theorems and examples.
6. Compute the average value over the interval.
7. Calculate the area bounded by a given curve and the given lines.
8. Use the integration techniques to compute $\int f(x) dx$ (substitution, parts, partial fraction. ...)
9. Calculate the area of a region bounded by a given curve and lines by computing the area using integration with respect to x and integration with respect to y .
10. Compute the volume generated when the region bounded by the given curve and lines is rotated by the x -axis and around the y -axis.
11. Calculate the length of a curve in the xy -plane.
12. Complete the derivative and integral of a given logarithm function, and exponential function.
13. Evaluate trigonometric integrals.
14. Recognize the appropriate hyperbolic and inverse hyperbolic functions.
15. Evaluate the $\int f(x)dx$ using integration by parts.
16. Integrate using Partial fractions with two linear terms, three linear terms and with a linear term and the square of a linear term.
17. Approximate integrals using some of the numerical method such as Trapezoidal Rule and Simpson's Rule

ABILITIES

The student will

1. Find the velocity function as the antiderivative of acceleration and the distance function as the antiderivative of the velocity function and other applications on the integration.
2. Compute a function when the derivative of the function and one point on its graph are given.
3. Approximate the area of a region bounded by the given curve, the x -axis, and the line $x = a$ and $x = b$, and checking the results with a graphing calculator.
4. Use the Mean Value Theorem to find the area under the graph of $y = f(x)$ for $[a, b]$.
5. Determine the definite integral of an absolute value function and the greatest integer function with the aid of a graphing calculation on an interval $[a, b]$.
6. Use the 2nd Fundamental Theorem of Calculus to calculate the derivative $F'(x_0)$ for a specific x_0 .
7. Compute the area of a region bounded by a given curve, lines, and axes using diagrams and the substitution method and checking the results with a graphing calculator.
8. Find the area of geometric figures without using the definition of integration and verify the answer using the definition of integration.
9. Calculate the volume of a region using both the disk method and the shell method.

10. Find the derivatives of an inverse function.
11. Compute the area of a region bounded by the given curves and lines using logarithmic and exponential functions e^x .
12. Compute the derivative and integral of hyperbolic, inverse hyperbolic and inverse trigonometric functions.
13. Evaluate integrals using the technique of integrations (substitutions, parts, partial fraction, etc) and approximate integrals using some of the numerical methods.

Grading Policy

Midterm Examination period: March 10-14
 Final Examination Period: May 6-9

BEFORE MIDTERM		AFTER MIDTERM	
Exams 1 and 2	200	(Midterm Average out of 100) X 3	300
HW & Quizzes	100	Exams 3 and 4	200
Midterm Exam	100	HW & Quizzes	100
		Final Exam	200
Midterm Total	400	Final Total*	800

Midterm Average – Your total Midterm points divided by 4.

Final Average – Your total Final points* divided by 8.

* An additional 10 points will be added to your final total, as an extra credit, for those who have a perfect attendance of the posted recitation sessions.

Standard Letter Grade

Percent	Grade	Percent	Grade
97%-100%	A+	77%-79.9%	C+
93%-96.9%	A	73%-76.9%	C
90%-92.9%	A-	70%-72.9%	C-
87%-89.9%	B+	67%-69.9%	D+
83%-86.9%	B	63%-66.9%	D
80%-82.9%	B-	60%-62.9%	D-
		0%-59.9%	F

The **MATH TUTORING LAB** is located in room 7S Hunter McDaniel Bldg (Basement), see the posted schedule for the hour of operation.

Course Outline

(the outline is based on the 6th edition)

Date(wk of)	Lecture Topics	Suggested practice exercises	Wk
	4.9 Antiderivatives 5.1 Areas	3, 7, 11, 13, 15, 19, 21, 33, 35, 37, 40 17, 19, 21	1
	5.2 The definite integral and Riemann Sum 5.2 Riemann Sum	9, 17, 19, 21, 23, 25, 29, 35, 37, 40, 49, 53, 55, 59	2
	5.3 The Fundamental Theorem of Calculus (I & II) 5.4 Indefinite Integrals	7, 9, 13, 17, 19, 23, 27, 28, 29, 45, 47, 50, 51 7, 9, 11, 19, 21, 25,	3
	Tentative date for Exam I ⁽¹⁾ 5.4 Indefinite Integrals and Some Applications	Covers sections 4.9, 5.1-5.4(or part of it) 29, 33, 55, 57	4
	5.5 The Substitution Rule 5.5 The Substitution Rule	2, 3, 5, 9, 13, 21, 25, 27, 37, 46, 47, 65, 67, 69, 73, 79, 80	5
	6.1 Areas between Curves 6.2 Volumes	1, 3, 5, 6, 11, 13, 17, 19, 27, 29, 54 1, 3, 5, 7, 9,	6
	Tentative date for Exam II ⁽¹⁾ 6.2 Volumes	Covers 5.4-6.1 11, 17, 43	7
	Review for the midterm Exam Midterm Exam (March 10 – March 14)	Midterm exam covers all of the above sections	8
	Spring Break (March 15-22)	(No classes)	9
	7.2 Integrals of Exponential Functions 7.4 Integrals of Logarithmic Functions	73, 75, 77, 79, 80, 84 69, 71, 73, 75, 77, 79	10
	7.7 Hyperbolic Functions 8.1 Integration by Parts	31, 33, 35, 37, 41, 57, 59, 63, 65 3, 4, 7, 17, 20,	11
	8.1 Integration by Parts Tentative date for Exam III ⁽¹⁾	23, 28, 35 Covers 7.2-8.1	12
	8.2 Trigonometric Integrals 8.2 Trigonometric Integrals	1, 3, 5, 7, 13, 16, 21, 43, 29, 35	13
	8.3 Trigonometric Substitution 8.4 Integration of Rational Functions by Partial Fractions	1, 3, 7, 13, 17, 19, 22 1, 3, 4, 5, 7, 9, 11, 15, 17, 43, 47	14
	Tentative date for Exam IV ⁽¹⁾ 8.5 Review Strategy for Integration Review for the final exam	Covers 8.2-8.5 1, 3, 7, 11, 15, 31, 41, 45,	15
	Final Exam period begins (May 6-9)	The final exam is a comprehensive exam covering all of the above sections.	16

(1) Test date is subject to change.

Exam I: The week of Feb. 9

Exam II: The week of March 2

Exam III: The week of April 6

Exam IV: The week of April 27

Key dates of the University calendar

Monday Jan 26: Last day to add/drop a course

Wednesday Feb 11th: Assessment day

March 6th: Founder day

Tuesday-Friday March 10-14: Midterm Examination period

Sunday-Sunday March 15-22: Spring break (No classes)

Monday-Friday March 23-April 17th: Early registration for Fall 2009

Friday March 27: Last day to withdraw from class(s) (grade registered as W)

Monday May 4th: University classes end

Tuesday May 5th: University reading day

Wed-Sat April 6-9: Final Exam period

Bibliography

- **Calculus and Analytic Geometry**, *Thomas, George G. Jr., and Finney, Ross L.*, 9th Edition, Addison Wesley Publishing Company, Reading Massachusetts, 1996.
- **Calculus**, *Stewart James*, 3rd Edition, Brooks Cole Publishing Company, 1995.
- **Calculus**, *Varberg, Dale and Puriell, Edwin J.*, 7th Edition, Prentice Hall, Upper Saddle River, NJ.
- **Calculus**, *Edwards and Penney*, 6th Edition, Prentice Hall, Upper Saddle River, NJ
- **Insights into Calculus with The Graphing Calculator**, *Hollister, Herbert A.*, D. C. Heath and Co., Lexington, Massachusetts 1993.