General Calculus Course Description and Syllabus

· **Course Objective:** This course will cover all the material typical found in the first semester of college level calculus. I am using Calculus 1 syllabi from Auburn University and the University of Alabama as my guide. After taking this course, your freshman calculus class in college should be mostly review.

· **Calculator Needed:** The only calculator you will be allowed to use on a test is a scientific calculator. My reasoning for this is that the majority of college professors don't allow calculators at all. In my opinion the best, most user-friendly scientific calculator is the TI-30XS MultiView ($14 on Amazon). You MAY NOT use a scientific calculator capable of calculus operations. I know which ones can do this. Don't test me.

· **NO FLIPPED CLASSROOM THIS YEAR:** I'm sorry if you were looking forward to that this year. In my years of using the flipped classroom I've discovered that it makes it extremely easy for lazy students to be even lazier. My class structure this year will be more traditional, with notes taken in class and book work assigned for homework. We will occasionally have a video lesson for homework, but that will not be the norm.

· **Expectations:**

1. Be mature. Don't try to use faulty or cliché logic to escape your responsibilities as a student – such as, "When are we ever going to use this?" The gods of math are watching you and it's on the test. That should be good enough motivation to do your best.
2. Do all your homework and come back to class with questions if you're confused.
3. If you have an extreme lack of understanding in a particular area come see me outside of class time. I cannot spend time giving a private tutoring session during class time.
4. Be respectful of me, my classroom, and other students.

· **Grading Breakdown:** Your final grade will be determined by the following percentages:

· Tests & Projects: 70%
· Quizzes: 20%
· Homework/Classwork: 10%

If you have any questions I can be reached at pcarboni@hoover.k12.al.us.

· **Classroom Donations:** I am usually in need of paper towels, Kleenex, and hand sanitizer. If you are a kind soul who wants to make a donation these are the things I would like.

· **Social Media:** I will occasionally post announcements and such on Instagram and Twitter. Follow @MathGnome to get these announcements.

I can be reached at pcarboni@hoover.k12.al.us if you ever have any questions or concerns regarding the class.

CALCULUS TOPIC OUTLINE

	Topic	Textbook Section	Date Covered
Unit 1: Functions & Graphs Review	20 Functions to Know & Love	Supplement	
	Discontinuities & asymptotes	Supplement	
	Domain & Range	Supplement	
	Transformations	Supplement	
	Inverse Functions & Logarithms	Supplement	
	Intermediate Value Theorem	1.4 (P.80, #83-94)	
Unit 2: Limits	Evaluate Limits with Graphs	1.2	
	Evaluate Limits with Tables	1.2	
	Evaluate Limits with Algebra a. Plug in b. Factor c. Conjugates	1.3	
	One-sided limits	1.4	
	Limits involving infinity a. As $x \to \infty$. b. Answers involving ∞	a. 3.5 b. 1.5	
	Average Rates of Change ➔ Approximate average rate of change on a table or graph	Supplement	
	Continuity (defined by limits)	1.4	
	Limit Derivatives a. Slope at a point (instantaneous rate of change) b. General derivative	2.1	
	Relating graphs of *f* and *f'*	Supplement	
Unit 3: Differentiation Techniques	Power Rule (include expanding & STDs)	2.2	
	Product Rule	2.3	
	Quotient Rule	2.3	
	Trig Derivatives	2.3	
	Exponential Derivatives	5.4 & 5.5	
	Chain Rule	2.4	
	Implicit Differentiation	2.5	
	Logarithmic Derivatives Include $y = f(x)^{g(x)}$	5.1 & 5.5	
	➔ Inverse Derivatives (with implicit)	Supplement	
	Inverse Trig Derivatives	5.6	
	Relating *f* and *f'* with increase & decrease	Supplement	

	Topic	Textbook Section	Date Covered
Unit 4: Applications of Derivatives	Extreme Value Theorem	3.1	
	Mean Value Theorem & Rolle's Theorem	3.2	
	Curve Sketching **a.** Intercepts **b.** Discontinuities **c.** Asymptotes **d.** Increase/Decrease intervals **e.** Local Extrema **f.** Concavity **g.** Inflection Points	3.6 (summary) **a.** supplement **b.** supplement **c.** supplement **d.** 3.3 **e.** 3.3 **f.** 3.4 **g.** 3.4	
	Linear Approximation & Differentials	3.9	
	Optimization	3.7	
	Related Rates	2.6	
	L'Hopital's Rule - Product & Quotient Indeterminate	8.7	
	Rates of Change a. Direction of Travel b. Total distance vs. displacement c. Speeding up and slowing down d. Growth & Decay	Supplement (Stewart §3.3)	
Unit 5: Areas & Integration Techniques	Polynomial & recognition antiderivatives	4.1	
	Areas: **a.** Riemann Sums (left, right, and midpoints) **b.** Trapezoids **c.** Definite Integral Notation & Properties **d.** As related to position, velocity, and direction of travel **e.** Exact areas with geometry **f.** Exact areas with antiderivatives	 **a.** Supplement **b.** 4.6 **c.** 4.3 **d.** Supplement **e.** Supplement **f.** 4.4 (FTC)	
	Fundamental Theorem of Calculus	4.4	
	Integration with *u*-substitution	4.5 & 8.1	
	Using initial values to find specific antiderivatives	Supplement	
Unit 6: Applications of Antiderivatives	Area between two curves	7.1	
	Volumes: **a.** Disks **b.** Washers	 **a.** 7.2 **b.** 7.2	
	Areas as related to position & distance (total change)	4.4 (& supplement)	