

# MATH 180 OUTLINE

## CALCULUS AND ANALYTIC GEOMETRY

TEXT: Thomas' Calculus, Early Transcendentals  
12th Edition, Thomas, Weir, Hass

Approved: JUNE 2010

Effective: FALL 2010

MATERIAL TO BE COVERED	SECTIONS FROM TEXT	TIME LINE
Functions: functions and their graphs, mathematical models, combining functions, graphing with calculators and computers, exponential functions, inverse functions and logarithms.	1.1 - 1.6	3.25 Hours
Limits and Continuity: rates of change and limits, calculating limits using limit laws, precise definition of a limit, one-sided limits and limits at infinity, infinite limits and asymptotes, continuity.	2.1 - 2.6	7 Hours
Differentiation: the derivative as a function, differentiation rules, the derivative as a rate of change, derivatives of trig functions, the chain rule and parametric equations, implicit differentiation, derivatives of inverse functions and logarithms, inverse trig functions, related rates, linearization and differentials.	3.1 - 3.11	16 Hours
Applications of derivatives: extreme values of functions, Mean value Theorem, First Derivative Test, concavity and curve sketching, applied optimization problems, indeterminate forms and L'Hopital's Rule, Newton's Method, Antiderivatives.	4.1 - 4.8	10 Hours
Integration: Estimating with finite sums, sigma notation and limits of finite sums, the definite integral, Fundamental Theorem of Calculus, indefinite integrals and the substitution rule, substitution and area between curves.	5.1 - 5.6	11 Hours
Transcendental Functions: logarithm defined as an integral, exponential growth and decay, separable differential equations. Relative rates of growth.	7.1 - 7.2 & 7.4	3 Hours
Integration by parts.	8.1	2 Hours

\*\*\* One hour = 1 hour of face time. \*\*\*\*This outline allows for 4 hours of exams.

16 Week Term: 1 week = 3.75 hours (face time)    6 Week Term: 1 week = 10 hours (face time)

### NOTES:

1. It is expected that a student leaving this course will have had experience with a computer algebra system. A minimum of two computer assignments is needed.
2. A computer algebra system handout and the Logic handout should be distributed to all students: ALL STUDENTS need to be exposed to proofs and logic.
3. At least 25% of the grade should be based on student performance without the aid of a graphing calculator or computer.
4. Chapters 5 and 7 are extremely important in Math 181. Instructors need to spend sufficient time on these sections.
5. Practice exams can indicate types of problems but actual problems should be substantially different.

**\*\* See reverse side for important Department Policy\*\***

Submitted by: Griffith, Guth, Khoddam, Kojima, Pop, Sholars, Tamayo, Tran