

**UNIVERSITY OF NORTH GEORGIA  
DEPARTMENT OF MATHEMATICS SYLLABUS**

Course: MATH 2040 – Brief Calculus  
 Prerequisite: Grade of C or above in MATH 1111  
 Semester: Spring 2014  
 Instructor: Thomas Hartfield  
 Office: Watkins Academic Building - 120  
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 Office Hours: Mornings: 8:30 am – 10:00 am, Monday through Friday  
 Afternoons: 2:40 pm – 3:10 pm, Monday & 2:00 pm – 3:10 pm, Tuesday  
 Withdrawal Deadline: Monday, March 3, 2014  
 Final Exam: Monday, April 28, 2014 at 10:20am  
 Catalog Description: This course is intended for non-science majors, with particular emphasis on applications of calculus to business. It will develop familiarity with such concepts as limits, the derivative, the definite integral, the indefinite integral and their applications.

- Course Content:
1. Review of logarithmic and exponential functions (brief)
  2. Limits and the derivative
  3. Differentiation rules for algebraic, exponential, and log functions
  4. Applications of differentiation
  5. Antiderivatives and the definite integral
  6. Applications of integration
  7. Multivariable functions and partial derivatives

Unit	Primary Topics	Sections	Test Date
1	Limits, Continuity, Rates of Change, Basic Derivative Rules, Higher-Order Derivatives, Marginals	2.1, 2.2, 2.3, 2.5	Jan 27
2	More Derivative Rules, Differentiability, Absolute Extreme Values	2.4, 2.6, 2.7, 3.3a	Feb 7
3	Relative Extreme Values, Increasing/Decreasing Intervals, Concavity, Graphs of Functions, Optimization	3.1, 3.2, 3.3b, 3.4/5	Feb 24
4	Exponentials and Logarithms Derivative Rules, Relative Rate of Change, Elasticity of Demand	4.1, 4.2, 4.3, 4.4	Mar 12
5	Multi-variable Functions, Partial Derivatives, Optimization	7.1, 7.2, 7.3	Mar 31
6	Antidifferentiation and Indefinite Integration, Definite Integration and Area Under a Curve, Average Value	5.1, 5.2, 5.3/4, 5.5	Apr 18

- Course Objectives: Upon successful completion of the course, the student will be able to
1. Evaluate Limits
    - Using numerical, graphical and analytic techniques, investigate the behavior of a function by using the concept of a limit.
    - Evaluate limits exactly, using analytic methods.
    - Describe the behavior of a function by identifying asymptotes and its behavior at infinity.
  2. Define the derivative.
    - State the definition of the derivative.
  3. Interpret the value of a derivative as a rate of change.
  4. Differentiate algebraic, exponential, and logarithmic functions.
    - Analyze the behavior of a function by using derivatives.
  5. Solve application problems using differentiation.
  6. Apply optimization techniques to algebraic, exponential, & logarithmic functions.
    - Find local maxima and minima of a function.
  7. Solve applications involving optimization.
  8. Find antiderivatives of functions that are algebraic, exponential and/or logarithmic.
  9. Evaluate definite integrals by using the fundamental theorem of calculus.
  10. Use definite integrals to determine area.
  11. Interpret a definite integral as an area or as net change.
  12. Optional objectives may include but are not limited to:
    - Use the definition of the derivative to find derivatives of simple functions.
    - Identify the properties of logarithmic and exponential functions
    - Solve logarithmic and exponential equations
    - Solve application problems involving logarithmic and exponential functions.
    - To find partial derivatives of functions.
    - To apply optimization techniques to multivariate functions.
    - Solve applications using linear approximations.

- Knowledge Base:
1. Textbook: Brief Applied Calculus, 5<sup>th</sup> ed., Berresford and Rockett
  2. Required Online Access: WebAssign for Brief Applied Calculus, 5<sup>th</sup> ed. Spring 2014 WebAssign Course Key: **ung 6230 5357**
  3. Library Resources:
    - Dunham, *Journey Through Genius : The Great Theorems of Mathematics*, Wiley & Sons, New York, 1990.
    - *Schaum's easy outlines. Calculus* : based on *Schaum's Outline of differential and integral calculus* by Frank Ayres, Jr. and Elliot Mendelson [computer file] / abridgement editor, George J. Hademenos.
    - *Women, Minorities and Persons with Disabilities in Science and Engineering: 1996* (National Science Foundation, 1997)
    - *Women and Science Celebrating Achievements Charting Challenges* (National Science Foundation, 1997)
    - *Multicultural and Gender Equity in the Mathematics Classroom: The Gift of Diversity* (Janet Trentacosta & J. Kenney, Eds., NCTM, 1997)

4. Web-based Resources:
  - Geogebra <http://www.geogebra.org>
  - MathWorld (Encyclopedia of Mathematics) - <http://mathworld.wolfram.com>
  - PurpleMath – <http://purplemath.com>
  - Drexel Math Forum - <http://mathforum.org/>
  - Texas Instruments - [www.education.ti.com](http://www.education.ti.com)
  - Math Nerds - [www.mathnerds.com](http://www.mathnerds.com)
  - Wolfram Alpha Knowledge Engine - <http://www.wolframalpha.com/>
  - AMS Math Moments - <http://www.ams.org/mathmoments/>
  - Maple Software Student Center - <http://www.maplesoft.com/students/index.aspx>
  - Texas Instruments - <http://education.ti.com/educationportal/>
  - Key Curriculum Press - <http://www.keypress.com/>
  - SOS Mathematics – <http://www.sosmath.com/>
  - Project Interactivate - [www.shodor.org/interactivate](http://www.shodor.org/interactivate)
  - Association for Women in Mathematics - <http://www.awm-math.org>
5. Technology Resources:
  - Graphing calculator, e.g. TI-83 / TI-84, without symbolic algebra manipulation
  - Maple

Methods of Instruction: Will include, but are not limited to lecture, problem-solving sessions, feedback from formative assessments, and computer and/or calculator based explorations. Students are encouraged to assess and monitor their own problem-solving process to determine when an error has been made or a new strategy should be used.

Evaluation Methods: Formative assessment will be in the form of six written tests and summative assessment will be in the form of a final examination. Homework grades will be used to supplement the formative assessment.

Excessive Absences: Students with greater than six absences during the term, including three consecutive unexcused absences at any time, may be withdrawn from the class by the instructor in accordance with the UNG policy on excessive absences. Students withdrawn from the class prior to the midpoint may receive either a W or a WF. Students withdrawn from the class after the midpoint will receive a WF.

Final Grades: The semester average will be determined by the average of eight scores comprised as follows: the five highest test grades, the homework average, and the final exam counting twice.

Schedule Changes: The instructor reserves the right to reschedule assignments by up to two class meetings due to unexpected events or adjustments in class pacing. Test postponements may be announced up through the class meeting preceding the scheduled date of test.

Testing Policy: Tests may be taken prior to the scheduled due date upon request with the instructor. Tests may not be taken late; no makeups will be given.

Supplemental Syllabus: Additional information is provided at <http://ung.edu/academic-affairs/policies-and-guidelines/supplemental-syllabus.php> covering the following topics: Academic Success Plan Program, Students with Disabilities, Academic Integrity Policy, Disruptive Behavior Policy, Class Evaluations, Academic Exchange, Inclement Weather, & Course Grades and Withdrawal Process