MAT 120: Calculus for Business and the Social Sciences

Course Number: MAT 120

Course Title: Calculus for Business and the Social Sciences

Credits: 3:3

Prerequisites/Corequisites: An acceptable score on the mathematics placement test or a grade of at least C in MAT 115 or MAT 150.

For Whom Planned: Primarily for students in the Bryan School of Business and Economics. This course is not a substitute for MAT 191, Calculus I.

Instructor Information:

Instructor: Ms. Walker Weigel (wgweigel@uncg.edu)

Office Hours: M and W 10–noon, T and Th 11–noon in Petty 113 and by appointment.

Bulletin Description: Limits and introductory differential calculus of the algebraic, exponential, and logarithmic functions of one variable.

Note: This course does not serve as a prerequisite for MAT 292 (Calculus II).

Student Learning Outcomes: MAT 120 provides students an opportunity to appreciate certain concepts in fundamental mathematics, especially functions, limits, derivatives, and applications of the derivative with emphasis on applications in business and social sciences. The emphasis is on abstract reasoning, not routine manipulations. MAT 120 satisfies the Mathematics (GMT) requirement of the General Education Program. It is open to and appropriate for all undergraduate students, regardless of major. The General Education learning goals attached to the GMT marker are as follows:

LG1   Foundational Skills: Think critically, communicate effectively, and develop fundamental skills in quantitative and information literacies.

LG2   The Physical and Natural World: Understand fundamental principles of mathematics and statistics, and recognize their relevance in the world.

At the successful completion of this course, the student will be able to:

SLO1   Reason in mathematical systems beyond data manipulation. (LG1, LG2)

SLO2   Formulate and use mathematical models to solve real-world problems. (LG1, LG2)

SLO3   Communicate mathematical solutions clearly and effectively. (LG1)

Course Objectives:

(1) Use algebraic, logarithmic and exponential models to solve real world problems involving growth and decay and economic questions.
(2) Define continuous functions and the derivative of a function.
(3) Give examples of continuous and differentiable functions, increasing and decreasing functions, concave up and concave down functions.
(4) Graph algebraic, logarithmic and exponential functions using intercepts, limits, and sign charts of the first and second derivatives.
(5) Construct mathematical models for an optimization problem, solve and interpret the results in the context of the original problem.

Teaching Methods and Assignments for Achieving Learning Outcomes: Abstract reasoning (SLO1) and clear, effective communication (SLO3) are a part of every lesson and homework in this course. The student, through regular and frequent attention to the lessons and homework questions, will make progress on each of these learning objectives. The formulation and use of mathematical models in real-world problems (SLO2) are integrated in the application of the fundamental techniques covered in the course. Homework questions are designed to reinforce these mathematics learning objectives.

Examples of specific course content addressing the various learning goals:

(1) Students are trained to solve equations using logarithms and exponentials and to find maximum value and minimum values of functions using tools of calculus.
(2) The techniques taught cannot be used uncritically. For almost every problem thought must be given as to what technique should be used and how to use it properly.
(3) Students must assess realistic financial and business problems presented in ordinary English language form and then apply appropriate mathematical models to them. Solving these models is supposed to give a prediction about the real-world behavior, such as the optimal pricing (or production level) of a product, the likely outcome of an investment, etc.
(4) The mathematical models taught in the course cannot be used uncritically as they often do not apply universally. Some care must be taken to see that sensible real-world conclusions are obtained.
(5) Extensive online homework is given to test this material, a total of 23% of the grade for the course. Problems given here are largely free-response and the student must be able to solve the problem on his own and enter the answer on his own in mathematical form. Problems are randomly generated for each individual. Test questions are multiple choice but specifically designed to catch common errors in reasoning that lead to incorrect answers.

Midterm Tests and Final Exam: The three tests will consist of multiple choice questions, no partial credit will be given for wrong answers. They are timed 60 minutes. The final exam is cumulative with multiple choice questions.

Homework: Read material in eText before attempting the homework: click on Chapter Contents in the MyMathLab menu, scroll down and click on the chapter you want, then click on the desired section and click on Multimedia eText. We will use the online homework system MyMathLab.com. Graded assignments are found in MyMathLab under HOMEWORK > Homework tab. Due dates are posted with each assignment and will not be extended. The online questions are algorithmic iterations of textbook exercises. If you do not know how to do a problem you may get help by clicking on Help Me Solve It or Textbook on the right side of the problem. Some problems have related video instruction. Homework assignments can be repeated an infinite number of times before the due date and the best score is recorded in MyMathLab. You must score 70% or above on any HW to access the quiz on that material. Start assignments in MyMathLab EARLY to allow enough time to make the minimum required score of 70%. Your lowest homework grade will be dropped when calculating your course average.

Quizzes: For each of the online homework assignments, there is an associated online quiz in MyMathLab under Quizzes & Tests > Quizzes & Tests tab. Due dates are posted in MyMathLab with each quiz and will not be extended. In order to begin the online quiz, you

must score at least 70% on the associated online homework assignment. (If you do not score a 70% or higher on the homework by the due date, you will not be able to take the associated quiz which will result in you earning a 0% on that quiz.) Quizzes can be submitted up to 3 times and the highest score of all attempts will be the recorded grade for that particular quiz. Each attempt is timed 60 minutes. It is recommended that you take a quiz more than once. Your lowest quiz grade will be dropped when calculating your course average.

Evaluation and Grading: The primary student products are the tests and final exam. Due to the nature of the course, each test will address all of the SLOs. Specifically, SLO1 will be present in most of the questions. Several questions on each test will be designed to address SLO2 and SLO3. Since the final exam is cumulative, all of the SLOs will be addressed there. The student will demonstrate achievement of learning objectives through satisfactory completion of graded assignments and tests. The questions on graded assignments and tests are designed to evaluate each of the three learning objectives, and in this way the grade reflects the attainment of the objectives.

The semester grade will be calculated as follows:

3 midterm tests (15% each)	45%
Homework (MyMathLab)	8%
Quizzes (MyMathLab)	15%
Regression assignment	2%
Final exam	30%

Letter grades are assigned on a 10 point scale.

A+ : 97–100	B+ : 87–89	C+ : 77–79	D+ : 67–69	
A : 93–96	B : 83–86	C : 73–76	D : 63–66	F : 0–59
A− : 90–92	B− : 80–82	C− : 70–72	D− : 60–62	

Required Texts/Readings/References: A MyMathLab/Mastering access code is required for this class. You can purchase the access code through the college bookstore, through online vendors, or through the publisher at http://pearsonMyLabandmastering.com. You will need to register for the course with the Course ID:

weigel94947

All students must be registered in MyMathLab by the end of the drop/add period August 22. The first online assignment is due online Friday, August 22, at 11:59pm.

Optional Textbook:

Richard A. Barnett, Michael R. Ziegler, and Karl E. Byleen, *Calculus for Business, Economics, Life Sciences and Social Sciences*, 12th ed., Prentice Hall, 2011.

You are not required to buy this textbook. There is an online version of the text available through MyMathLab/Mastering. The eText is accessed online in the MyMathLab course > Chapter Contents: select the chapter and section you want.

Topical Outline/Calendar: The course covers the following:

Topics	Sections
Linear Equations and Graphs	1.1, 1.2
Functions and Graphs	2.1, 2.2, 2.3, 2.4, 2.5, 2.6
Limits and the Derivative	3.1, 3.2, 3.3, 3.4, 3.5, 3.7
Additional Derivative Topics	4.1, 4.2, 4.3, 4.4
Graphing and Optimization	5.1, 5.2, 5.4, 5.5, 5.6

A tentative schedule is given below.

Ch.	Assignment Name	Start	Due
O	Orientation HW	08/18/14	08/22/14
1	1.1–1.2 Homework	08/18/14	08/22/14
1	1.1–1.2 Quiz	08/18/14	08/25/14
2	2.1–2.2 Homework	08/22/14	08/29/14
2	2.1–2.2 Quiz	08/25/14	09/02/14
2	2.3–2.4 Homework	08/29/14	09/05/14
2	2.3–2.4 Quiz	09/01/14	09/08/14
1, 2	Test I (Offline)		9/10/14
2	2.5–2.6 Homework	09/11/14	09/19/14
2	2.5–2.6 Quiz	09/15/14	09/22/14
3	3.1–3.2 Homework	09/19/14	09/26/14
3	3.1–3.2 Quiz	09/22/14	09/29/14
3	3.3–3.4 Homework	09/26/14	10/03/14
3	3.3–3.4 Quiz	09/29/14	10/06/14
2, 3	Test II (Offline)		10/8/14
3	3.5–3.7 Homework (skip 3.6)	10/10/14	10/17/14
3	3.5–3.7 Quiz (skip 3.6)	10/13/14	10/20/14
4	4.1–4.3 Homework	10/17/14	10/24/14
4	4.1–4.3 Quiz	10/20/14	10/27/14
4, 5	4.4 & 5.1 Homework	10/24/14	10/31/14
4, 5	4.4 & 5.1 Quiz	10/27/14	11/03/14
5	5.2–5.4 Homework (skip 5.3)	10/31/14	11/07/14
5	5.2–5.4 Quiz (skip 5.3)	11/03/14	11/10/14
3, 5	Test III (Offline)		11/12/14
5	5.5–5.6 Homework	11/13/14	11/21/14
5	5.5–5.6 Quiz	11/17/14	11/24/14
1–5	Regression Assignment (Offline)		11/24/14
1–5	Final Exam (Cumulative, Offline)		12/03/14

Academic Integrity Policy: You are expected to abide by the UNCG Academic Integrity Policy at all times, and any cases of academic dishonesty will not be tolerated. Each student is required to sign the Academic Integrity Policy on all major work submitted for the course.

I have abided by the UNCG Academic Integrity Policy on this assignment.
Signature _____ Date _____

More information can be found at

http://sa.uncg.edu/handbook/academic-integrity-policy/.

Attendance Policy: Regular and punctual attendance is expected. You are responsible for any missed work and material.

Final Examination: Cumulative, multiple choice final exam, December 3, 8–11am.

Additional Information:

Calculator Policy: Scientific calculator is required. Graphing calculators are not allowed. Calculators that perform symbolic computations are not allowed. The TI30XII is recommended. It is an inexpensive scientific calculator. Bring your calculator to each test and to the final exam.

Test Makeup Policy: If you must miss a test, you should contact the instructor BEFORE the date of the test in order to schedule a makeup test. You must have a valid excuse and written evidence of it to be allowed to take a makeup test.

MyMathLab Support: The MyMathLab Technical Support number is 1-800-677-6337. Also you can reach MyMathLab Tech Support 24/7 from the MyMathLab Sign In page: under *For Students*, click on *Support* and then click on *Live Chat*.

Add/drop dates and holidays affecting this class:
(1) The last day to adjust your schedule with absolutely no penalty is Friday, August 22nd.
(2) Withdrawing from this course between August 23rd and October 10 will use 3 out of the 16 hour withdrawal limit and will be indicated on a transcript with a grade of WX.
(3) Dropping this course after October 10 or in excess of the 16 hour limit will result in a grade of WF, which is equivalent to a grade of F for your GPA.
(4) Labor Day holiday is September 1, Fall Break is October 11–14, and Thanksgiving holiday is November 26–30.

Students with Disabilities: You are responsible for contacting the OARS in 215 EUC (334-5440, http://ods.uncg.edu) and for filling out the necessary forms if you wish to have special accomodations. Without these forms the services provided by the OARS will not be available. OARS cannot schedule or reschedule tests without consent from the instructor.

Copyright Policy: Selling or purchasing notes from classes for commercial gain is a violation of the UNCG Copyright Policy. Any student who sells notes taken in class for commercial gain, or who purchases notes taken by another student for commercial gain, is in violation of this policy and, by extension, is committing a violation of the Student Code of Conduct.

http://sa.uncg.edu/handbook/student-code-of-conduct/

Free Tutoring: The Department of Mathematics and Statistics provides free walk-in tutoring in the Curry 210 beginning August 25. For the details, see

http://www.uncg.edu/math/mathhelpcenter

Student Success Center: Find more academic support at the Student Success Center.

http://success.uncg.edu/

Special Support Services: Tutoring may be available from Special Support Services.

http://success.uncg.edu/sss/tutoring.php

MAT 120: Explanation for GEC GMT Category Designation

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The content of MAT 120 is delivered in different formats, but with the exception of minor differences necessitated by the difference of format, the types of activities and assignments used to facilitate student achievement of the learning outcomes are the same. Due to the large class sizes of MAT 120, the predominant work products are multiple-choice quizzes and tests. The questions are carefully designed to ensure the successful student attains the three GMT learning objectives.