UNG UNIVERSITY of NORTH GEORGIA™
COLLEGE OF SCIENCE & MATHEMATICS
Department of Mathematics

Semester:	Spring 2025	
Course:	Mathematical Models – MATH 1101	
Instructor:	Thomas Hartfield	
Office / Web:	Watkins Academic Building - 120	http://faculty.ung.edu/thartfield/
Phone / Email:	678.717.3858	thomas.hartfield@ung.edu
In Person Office Hours: for Student Assistance:	Monday and Wednesday afternoon *(I may be unavailable in the last five minutes of each hour)*	2:00 pm – 5:15 pm

Online Meetings for Student Assistance: Please request at least 24 hours in advance via email
Note 1: Online meetings will be held using Zoom via D2L.
Note 2: Emails will receive a response within 24 hours on weekdays, except during Spring Break.

First Day for Withdrawal (W): Friday, 17 January 2025 after 3:00 pm
After this date and time, exiting the course will require either a withdrawal (W or WF) or a letter grade (A/B/C/D/F).

Last Day for Withdrawal (W): Friday, 21 March 2025 before 11:59pm
After this date and time, it is no longer possible to withdraw with a W. A student withdrawing after this point will receive a WF.

Final Day of Class: Friday, 2 May 2025

Final Exam: 1:00pm class: Friday, 9 May 2025 at 12:40 pm in Watkins 134

Textbook:
1. Textbook: *Mathematics with Applications in the Management, Natural, and Social Sciences*, 13th ed. by Lial/Hungerford/Holcomb/Mullins. (Publisher: Pearson Education, 2024)
2. Online Assignment Program: *MyLab* for *Mathematics with Applications in the Management, Natural, and Social Sciences*, 13th ed. Delivered through the learning management system D2L using the First Day Inclusive Access system.

Core Curriculum Info: This is a Core IMPACTS course that is part of the Mathematics area.

Core IMPACTS refers to the core curriculum, which provides students with essential knowledge in foundational academic areas. This course will help master course content, and support students' broad academic and career goals.

This course should direct students toward a broad Orienting Question:
- How do I measure the world?

Completion of this course should enable students to meet the following Learning Outcome:
- Students will apply mathematical and computational knowledge to interpret, evaluate, and communicate quantitative information using verbal, numerical, graphical, or symbolic forms.

Course content, activities and exercises in this course should help students develop the following Career-Ready Competencies:
- Information Literacy
- Inquiry and Analysis
- Problem-Solving

Tech Requirements:
- A TI-84+ or a graphing calculator at a level equivalent to a TI-84+
- A personal computer (or technological device) with internet access
- A webcam (if your personal computer does not have one built in)

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Course Description: This course is an introduction to mathematical modeling using graphical, numerical, symbolic, and verbal techniques to describe and explore real world data and phenomena. Emphasis is on the use of elementary functions to investigate and analyze applied problems and questions, supported by the use of appropriate technology, and on effective communication of quantitative concepts and results.
Credit: 3 hours.
Prerequisite: An Accuplacer Next-Generation Quantitative Reasoning, Algebra, and Statistics score of 258 or higher, MATH 1001 with a grade of D or higher when taken with MATH 0997, MATH 0099 with a grade of C or higher, any Area A MATH course with a grade of C or higher, old SAT Math score of 440 or higher, new SAT Math Section score of 480 or higher, new SAT Math Test score of 24 or higher, ACT Math score of 17 or higher, or MPI of 1175 or higher, or an Official HS GPA of 2.5 or higher.
Co-requisite: Students who do not meet the pre-requisites for Math 1101 are required to take Math 1101 with Math 0998, or Math 1001 with Math 0997.

Course Objectives: After completion of the course the student will be able to: (Required objectives)

- Apply a variety of problem-solving strategies including algebraic, numerical, and graphical techniques to solve linear, quadratic, and exponential equations.
- Apply the slope, point-slope, and slope-intercept formulas.
- Apply function concepts and notation including domain and range.
- Represent and solve real-world problems using linear equations.
- Recognize and solve exponential equations
- Apply knowledge of exponential equations to predict the long-term behavior of an exponential function.

After completion of the course the student will be able to: (Optional objectives)

- Compute simple and compound interest.
- Apply knowledge of ordinary annuities to compute present and future values of a stream of payments, to find the payment that will result in a given future value, or to find the payment that will amortize a given present value.
- Compute payments and future values of sinking funds.
- Apply knowledge of sets and set notation to find the complement, union, and intersection of given sets.
- Apply knowledge of Venn diagrams to find the number of elements in sets.
- Compute the sample space of an experiment
- Identify whether given events are mutually exclusive or not mutually exclusive.
- Compute the probability of the union of events.
- Identify whether given events are independent or dependent.
- Compute the probability of the intersection of events.
- Apply basic counting techniques, including permutations and combinations.
- Apply knowledge of counting techniques to compute probabilities.

Course Content:

Unit 1 Graphs, Equations of Lines, Linear Models, Systems of Linear Equations of Two Variables
Unit 2 Linear Inequalities, Graphs of Functions, Linear Functions, Composition of Functions
Unit 3 Quadratic Functions, Polynomial Functions, Exponential Functions
Unit 4 Logarithmic Functions, Logarithmic Equations, Exponential Equations
Unit 5: Sets, Venn Diagrams, Basic Concepts of Probability, Conditional Probability
Unit 6: Simple and Compound Interest, Annuities, Amortization, Bonds

Methods of Instruction:	Will include, but are not limited to: asymmetric video lecture, in-class lecture, question-and-answer 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.
Attendance Policy:	Students are expected to attend class unless they feel it is unsafe to do so for themselves or for the sake of others. Attendance will be checked for whatever format the class is meeting within. Absences from in-person instruction (when the campus is open) or from online instruction (when the campus is closed) will only be excused when notification is provided from the Office of the Dean of Students is received. Students with more than four unexcused absences, or nine or more total absences, may be withdrawn from the course by the instructor. Students repeatedly arriving late or leaving early may be assessed a cumulative absence if the aggregate time missed is equal to a full class period. Any student who fails the course will have his/her date of last attendance or assignment completed noted for federal financial aid regulations.
Classroom Recording:	Class sessions in Watkins 134 will be recorded through screen capture and room audio. These recordings will only be available to members of the classroom community and will be posted within eLearning within one week (preferably 24 hours but not guaranteed). Recordings are auto-captioned by computer. Viewing a classroom recording in lieu of being physically present in class will be considered an unexcused absence for attendance policy purposes (unless previously cleared by the instructor or excused by the Office of the Dean of Students).
Evaluation Methods:	Formative assessment will be in the form of five in-person written unit tests (units 1 through 5), supported by online assignments corresponding to topics in all six units. Summative assessment will be in the form of an in-person written final examination.
MyLab Assignments:	All homework assignments and quizzes will be completed through the MyLab platform which will be accessed via D2L through the First Day Access program. Homework for units 1 through 5 will be due at 11:59 pm the night before the unit test (as listed on the course calendar). Unit 6 homework is due at 11:59 pm on Monday, 5 May 2025. All homework assignments will remain open until 11:59pm on Monday 5 May 2025, with a 1% per day penalty applied to any question answered late. After this deadline, no additional work can be submitted for any reason.
Testing Policy:	Unit tests and the final exam will be given in a face-to-face format on paper; students will need to bring a pencil and their calculator (and only these items) for these tests. Work, as well as final answers, will be assessed, with partial credit being awarded as appropriate; credit can be withheld for a lack of written appropriate work. Students are expected to take tests and the final exam in the classroom unless the campus is closed. Tests in the classroom must be started before any student in the room completes the test. This requirement does not apply to students with appropriate accommodations through the Office of Student Accessibility Services. Students may request to take a test earlier than it is given in the classroom. Excluding highly exceptional circumstances, tests cannot be taken after they are given in the classroom (that is, no “make-up tests” will be offered).

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Academic Integrity:

Academic honesty is highly valued at UNG. "Academic honesty" means performing all academic work without plagiarism, cheating, lying, tampering, stealing, giving or receiving unauthorized assistance from any person, or using a unique source of information without properly acknowledging the source. "Academic dishonesty" means performing, attempting to perform, or assisting any other person in producing academic work that does not meet this standard of academic honesty.

During a test or exam, it is unacceptable to take, give, or receive aid of any type from another student. It is also inappropriate to use any electronic device, including a mobile phone, during an exam that has not been preapproved by the instructor. A TI-83/TI-84 calculator (or model with fewer functions) is approved for use during tests and exams.

A student who acts in an academically dishonest manner will receive a zero for the test or exam in question and be referred to the academic integrity process at UNG. Additional consequences may result from this process, up to, and including suspension or expulsion from the university.

Tutoring Resources:

Free tutorial assistance is available in the MathLab, located off the ACTT Center, in the Watkins Building of the Gainesville campus. Tutors in the MathLab are not intended to replace classroom instruction; the primary responsibility of tutors is to clarify possible misunderstandings and assist in understand the processes and purposes of assignments and assessments.

Final Grades:

The semester grade will be calculated as follows:

- The average of all homework assignments will count 15% of the semester grade.
- Four test scores each counting 15% of the semester grade.
- The Final Exam will count 25% of the semester grade.

If a student has test grades for all five tests during the semester and has not received a 0 on a test for academic dishonesty, the four highest test scores will be applied.

Any student assigned a 0 due to academic dishonesty will have the fourth best test score replaced by the 0.

If a student has scores for fewer than four tests, the grade on the final exam will be applied as a test score in order to have four scores in that category.

The homework average will be calculated based on a weighted average of all homework assignments scheduled in MyLab. Any assignment with no work applied to it by the end of the semester will receive a 0.

100%	90%	80%	70%	60%	0%
A	B	C	D	F	

Growth Mindset:

Learning mathematics is best accomplished by having a growth mindset which has been defined as "the understanding that abilities and intelligence can be developed" (referenced from C. Dweck's 2017 paper *Mindset Works*). While students may come in with varying levels of innate talent and preexisting knowledge, all students can increase their abilities and intelligence through effort and persistence.

Additional Resources:

1. Library Resources:
   - Mathematics Teacher, NCTM, Reston, VA.
   - Schaum's easy outlines. ***College algebra*** : based on Schaum's Outline of ***college algebra*** by Murray R. Spiegel and Robert E. Moyer [computer file] / abridgement editor, George J. Hademenos
   - Osen, Lynn. Women in Mathematics. Cambridge MA, MIT Press, 1974.
   - Bell, E. T. Men of Mathematics. New York: Simon & Schuster, 1937.
   - *Women and Science Celebrating Achievements Charting Challenges* (NSF, 1997)
   - *Multicultural and Gender Equity in the Mathematics Classroom: The Gift of Diversity* (Janet Trentacosta & J. Kenney, Eds., NCTM, 1997)
2. Web-based Resources:
   - Association for Women in Mathematics – http://www.awm-math.org
   - Careers in Mathematics – http://www.ams.org/early-careers/
   - Desmos – https://www.desmos.com/
   - Geogebra – http://www.geogebra.org
   - Khan Academy – https://www.khanacademy.org/
   - Math Forum – http://nctm.org/mathforum
   - Math is Fun – https://www.mathisfun.org/
   - Math is Power 4 U – http://www.mathispower4u.com/
   - Multicultural Pavilion – http://www.edchange.org/multicultural
   - PurpleMath – http://purplemath.com
   - SOS Mathematics – http://www.sosmath.com/
   - UNG Resources – http://www.ung.edu/learning-support/academic-resources.php

Limited Attempts Policy: UNG students in college-level courses are limited to three attempts at a course. An attempt is defined as any term resulting in a grade, a W, or a WF for the course.

Supplemental Syllabus: Additional information is provided at http://ung.edu/academic-affairs/policies-and-guidelines/supplemental-syllabus.php.

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Planned Course Calendar

Week	Monday		Wednesday		Friday	
1	Jan 13	Introduction	Jan 15		Jan 17	
2	Jan 20		Jan 22		Jan 24	
3	Jan 27		Jan 29		Jan 31	Test 1
4	Feb 3		Feb 5		Feb 7	
5	Feb 10		Feb 12		Feb 14	
6	Feb 17	Test 2	Feb 19		Feb 21	
7	Feb 24		Feb 26		Feb 28	
8	Mar 3		Mar 5		Mar 7	Test 3
Spring Break	Mar 10		Mar 12		Mar 14	
9	Mar 17		Mar 19		Mar 21	
10	Mar 24		Mar 26		Mar 28	
11	Mar 31		Apr 2	Test 4	Apr 4	
12	Apr 7		Apr 9		Apr 11	
13	Apr 14		Apr 16		Apr 18	Test 5
14	Apr 21		Apr 23		Apr 25	
15	Apr 28		Apr 30		May 2	
16	May 5	University Review Day	May 7		May 9	FINAL EXAM at 12:40pm

Unit 1	2.1, 2.2, 2.3, 6.1	Unit 3	3.4, 3.5, 4.1, 4.2a	Unit 5	8.1, 8.2, 8.3, 8.4-8.5
Unit 2	2.4, 3.1, 3.2-3.3, 3.7	Unit 4	4.2b, 4.3, 4.4	Unit 6	Chapter 5