MATH 1101, Mathematical Modeling, [TERM]

Course Instructor:

[Instructor Name]
[Institution name]
[Institution address]
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Office hours:
Xxxday, X:00 am/pm - X:00 am/pm

During office hours, you can find me in XXX. You can also reach me during office hours at the above phone number.

NOTICE: Please use the internal course e-mail for general correspondence. I provide my external e-mail address for emergencies only. I cannot answer questions, accept assignments, or discuss grades via external e-mail so please use it for emergencies only.

Response Time: Unless you are notified otherwise, I will work to respond to all student questions and emails within 24 hours during the week and within 48 hours during the weekend.

Accessibility Services

In order to receive special accommodations, **students must provide documentation to the instructor** from the disabilities center at their affiliate institution or from the Regents Center for Learning Disorders. If you are a student who is disabled as defined under the Americans with Disabilities Act and require assistance or support services, **please notify the instructor prior to attempting any activities or assessments in this course during the first week of class**.

Also, students with disabilities or who require special testing accommodations must contact the Testing Coordinator at etesting@westga.edu before scheduling an exam appointment.

Other resources:
https://ecore.usg.edu/current-students/accessibility-services
http://www.section508.gov
http://www.w3.org/TR/WCAG/
http://webaim.org/

Attendance Verification

IMPORTANT- In order to confirm your attendance and participation in this course, you must complete the Mandatory Attendance Quiz AND the Introductions discussion activity before the participation deadline. Please note that failure to complete these activities may result in you being removed from the course.

Participation dates for the term can be found in the News widget on your course homepage or at the following URL: https://ecore.usg.edu/courses/calendar/index.php. BOTH of these activities are required and can be found within the Course Content's Start folder.

Course Description:

Welcome to eCore **MATH 1101**!
Introduction : This course is an introduction to mathematical modeling. You will use 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.

Course Credit Compliance:

This course will be delivered entirely online with the exception of the minimum of one face-to-face (FTF) proctored exam and a maximum of two FTF proctored exams. This requires the online equivalent of 2850 minutes of instruction (instruction time) and an additional 4500 minutes of supporting activities. As such, you will be required to complete the following online activities during this course (times are approximate):

Instruction Time	
Discussion Postings	400 minutes
Virtual meetings/chat or audio & video	550 minutes
Course Content Facilitation	700 minutes
Quizzes/ online exams/ practice textbook exercises	900 minutes
Proctored Exams	300 minutes

It is anticipated that students will need to work independently for twice the number of minutes listed above to complete the online activities.

Prerequisites:

None

Course Objectives:

In this course, students will

- Understand the concept and basic properties of functions
- Understand the concept and basic properties of linear functions
- Understand the concept and basic properties of quadratic functions
- Understand the concept and basic properties of polynomials
- Understand the concept and properties of exponential functions
- Understand the concept and basic properties of logarithms
- Understand the concept and basic properties of piecewise-defined functions

Course Text and Materials

eCore has explored cost-reducing options for students and currently offers a free online text for this course. The online text allows students to read, download, and/or print the book chapters at no cost. **The textbook is embedded in the 8 units that constitute the course.**

Course Text

Title	*Intermediate Algebra*
Author(s)	Arnold, D., Butler, M., et al.
Publisher/Copyright	Department of Mathematics, College of the Redwoods
Edition	Fall 2007
Text URL	http://msenux2.redwoods.edu/IntAlgText
Full Text	Click **here** to download a PDF copy of the full text.
Type	Required Resource

Additional Information	All parts of this Intermediate Algebra Textbook are copyrighted in the name Department of Mathematics, College of the Redwoods. They are not in the public domain. However, they are being made available free for use in educational institutions. This offer does not extend to any application that is made for profit.

Additional Materials

Title	TI 83 Plus or TI 84 Plus Calculator
Type	Required Resource

Planet eCore

Visit the Planet eCore blog to read about eCore students, faculty, and trends in online education: http://planetecampus.blogspot.com/.

Technical Requirements and Assistance

Requirements:

Having a correctly configured computer will help ensure your success in eCore. Check the information at http://ecore.usg.edu/prospective/techreqs.php to be sure that your computer meets all the necessary technical requirements for hardware and software. Links to the plug-ins (special free software) that you will need are provided.

You will need access to some type of media player to watch video tutorials delivered throughout the course. You may need to download QuickTime player in the first few days of class. Select the following link and click "Free Download" to begin downloading QuickTime player now: http://www.apple.com/quicktime/.

Assistance:

For technical assistance contact the 24/hour helpline at https://d2lhelp.view.usg.edu/ (scroll down to the Student Support area).

In addition, please contact the eCore Helpline at 678-839-5300.

Discover an Error?

If you discover a typo, broken image, or other error in your eCore course, use the eCore Student Change Request Form to report the required change. Once the form is submitted, an eCore staff member will contact you within 48 hours.

Please note that this form is NOT for grade related or instructor related complaints. To report this type of information, please access the Student Complaint Policy page on the eCore website.

Smarthinking Online Tutoring:

Smarthinking is an online tutoring resource for eCore students providing assistance in Mathematics (basic Math through Calculus), Chemistry, Physics, Statistics, Spanish, and Writing. For login instructions, please refer to the Smarthinking page located within Course

Resources or access Smarthinking directly using the icon from the course navigation bar.

Grading and Standards

Grade Breakdown

GRADED ACTIVITY	WEIGHT	PROCTORED?	BRIEF DESCRIPTION
Participation/Discussions	10%		You will receive credit for the class participation component (a more subjective component) by getting acquainted with your classmates and your instructor via the discussion and email tools and by following through with any required postings/activities in the orientation lesson. You must also be able to demonstrate that you can access and use the equation editor.
Online Quizzes	20%		On quizzes, you will be allowed a maximum of 3 attempts for each online quiz; your quiz grade will be the highest of your score(s).
Four Online, 1 hour Tests	40%		10% each. On the 1 hour online Tests you will be timed, have approximately one hour, and be allowed exactly one attempt.
Proctored Midterm Exam	15%	Yes	All eCore students must complete a proctored examination. Failure to do so will result in failure of the course, regardless of grade point average. In the case of Math 1101, students must complete 2 proctored exams.
Proctored Final Exam	15%	Yes	All eCore students must complete a proctored examination. Failure to do so will result in failure of the course, regardless of grade point average. In the case of Math 1101, students must complete 2 proctored exams. ** *The Final Exam is cumulative*

Proctored Exams

A proctored experience is required for successful completion of an eCore course. In courses requiring only one proctored exam, failure to take that exam will result in a failing grade for the course regardless of average of other grades.

Proctored exams are password protected exams taken at an approved testing center or testing service. Students are responsible for scheduling and taking their exams by the posted deadline. Students are also responsible for being aware of the conditions and policies under which the exam will be proctored and administered. Each testing center or service sets its own proctor cost.

On the Course Homepage, use the **Proctored Exam Setup Widget** to view available proctored exams for the course, register for an exam, view an exam's duration, and view the list of allowed proctored material.

Grade Scale

Grades are based on student performance and capability. Simply turning in all the assignments does not guarantee that the student will receive a "good grade." To receive a higher grade, a student must demonstrate proficiency in the material. For different students, gaining that proficiency requires different levels of work, because not all students walk into the class with the same aptitude for the course content. The standards for the respective grades are as follows:

A: 90-100%
B: 80-89%
C: 70-79%
D: 60-69%
F: 0-59%

Grade Turnaround

All assignments and assessments will be graded within one week's time. The instructor will provide comments along with grade as necessary for feedback. All emails will be answered within 24 hours.

All grades will be posted in the Grades tool within the course. Students can access this tool from the Assessments tab on the course navigation bar.

Expectations and Standards

A – To achieve this grade the student must display superior performance in his/her course work. This includes demonstrating the ability to process and comprehend complex ideas, and to be able to convey those ideas to others in a clear, intelligent manner. An "A" student will go beyond simple requirements and seek to excel in his/her preparation for and presentation of assigned work. He/she will demonstrate excellence in communication skills and the ability to contextualize material.

B – To achieve this grade the student needs to display above average performance in his/her course work, including demonstrating the ability to process and comprehend complex ideas, while being able to convey those ideas in a clear, intelligent manner. A "B" student will also go beyond minimum requirements in terms of preparation and presentation of assigned work. He/she will demonstrate above average communication skills and ability to contextualize material.

C – For this grade, the student must meet the minimum requirements for the course, displaying adequate performance in his/her course work, and adequately demonstrate the ability to comprehend complex ideas, while also being able to convey those ideas in a like manner. A "C" student demonstrates competence in terms of preparation and presentation of assigned work. He/she will demonstrate adequate communication skills and ability to contextualize materials.

D – A student receiving this grade is performing below the minimum requirements for the course. This could include failure to complete or turn in assignments on a timely basis, or failure to adequately demonstrate the ability to comprehend or convey complex ideas. A "D" student performs below the average in terms of preparation and presentation of assigned work. He/she may not be demonstrating adequate communication skills or ability to contextualize materials.

F – A student receiving this grade has failed to meet the requirements of the course, including failure to complete or turn in assignments, or failure to demonstrate the ability to comprehend or convey complex ideas. An "F" student has not performed in a manner satisfactory to the standards of the class.

Attendance, Participation, and Late Policy

"Attendance" and participation are required. You will be expected to participate in ongoing discussions of the lesson topics and to interact with other students and your instructor regularly. It is expected that you will demonstrate a positive attitude and courtesy toward other participants in the discussion and observe good discussion netiquette. Be sure to read and observe the following procedures:

- You are a guest in the instructor's classroom, so be sure to observe the class rules.
- Practice manners and civility, and be polite and respectful of your instructor and classmates in all your communication.
- Respect your instructor, and be on time in your work submissions.
- Keep your instructor informed of your status.

- Address your instructor as Professor or Doctor.
- Use correct grammar and punctuation in all your communication ('Dear Professor xxx' not 'Hey').
- Accept your instructor's feedback and learn from it.

In the online environment, problems associated with power outages, networks being down, and ISP troubles inevitably result in legitimate reasons for delays, however, you should still be prepared to deliver your work by the stated deadlines. If you have a problem, let your instructor know as soon as possible. The student who repeatedly turns in late work will be subject to penalties.

Time Commitment

Taking an online course is *not* easier or faster. On the contrary, it will take as much time as taking a face-to-face class or more. If you normally go to class 3 hours per week per course, you will need to devote that same amount of time to your online course. In addition to online time, you should spend time studying and working with course materials several hours per week offline. It will be helpful to set aside regular study time when you can work uninterrupted. Offline time could be spent in composing messages to post online, reading, studying, and working homework problems.

The amount of time it will take you to complete the work for the course will depend on many factors, which will vary with each individual. Students can expect to spend anywhere from 8 - 15 hours per week on this course. Consult with the course Calendar and your instructor to be sure you are on schedule, keeping up with the material and taking quizzes on time.

As a general rule in this course, you will be expected to

- Log in regularly to check messages from your instructor and other students.
- Check the Calendar for announcements from your instructor.
- Study, read online materials, and work all assigned problems for each lesson.
- Complete all course work and assignments in the time allowed.

Course Structure

This course is broken into 8 Lessons:

- LESSON 1 - Introduction to Functions
- LESSON 2 - Functions, Graphs, Solving, and Applications
- LESSON 3 - Linear Functions
- LESSON 4 - Quadratic Functions
- LESSON 5 - Power and Polynomial Functions
- LESSON 6 - Exponential Functions
- LESSON 7 - Logarithmic Functions

- LESSON 8 - Piecewise-Defined Functions

The course includes a proctored mid-term and a proctored final. Students will have to travel to a proctored site for these exams. These arrangements will be finalized with the eCore staff during the course.

Strategies for Success :

In general, students are advised to work some on this course every day. It is not advisable to leave everything for the last minute or even for the weekend. If you get stuck on a problem or if there is something you do not understand, you should immediately post an inquiry using the Discussion tool. Post in the Lesson Discussion forums to discuss inquiries with classmates or the Tutor Talk forums to discuss inquiries with the embedded math tutor. You should visit the Discussion tool and check your email often - certainly at least once a day if possible. Pay close attention to the Advance Organizers in each Lesson, and visit the Quiz and Online Test preparation section at the end of each lesson often for helpful hints, reviews, and additional videos.

Lesson Breakdown

Lesson Objectives

Lesson 1 - Introduction to Functions

1. understand the concept of a function.
2. understand the concept of domain and range of a function.
3. understand different ways of representing a function, that is, by using formulas, graphs, tables, and words.

Lesson 2 - Functions, Graphs, Solving, and Applications

1. solve linear equations symbolically.
2. understand and apply some basic properties of graphs of functions such as intercepts, and intersections on the TI 83/84 calculator.
3. solve equations using the TI 83/84 calculator.
4. set up formulas for functions related to economic, geometric and physical models. In particular, the student should be able to convert a simple verbal description of a function into a formula or graph of the function.
5. understand some basic properties of graphs of functions such as intercepts, increasing, decreasing, concave up and concave down and what these properties mean in practical terms.
6. solve optimization problems using the graphing calculator.

Lesson 3 - Linear Functions

1. determine if a table of ordered pairs for a function can be modeled by a function.
2. graph linear functions defined by a table of values.
3. find the slope of a linear function defined by a table of values.
4. find the slope of a linear function given its graph where two points are identifiable.
5. find the slope of a linear function given an expression that defines the function.
6. find the slope as rise/run for a given problem.
7. find a formula for a linear function given a table of values for the function.
8. find the *y*-intercept of a linear function given a table of values, a graph, or a defining expression.
9. understand least squares as a way to find the line of "best fit" for a given set of ordered pairs.
10. draw a scatter plot on a TI-83/84.
11. find the regression equation for a set of data using the TI-83/84.
12. use a regression equation to answer questions about related data.

Lesson 4 - Quadratic Functions

1. be familiar with the general form of a quadratic function.
2. understand the basic relationships between the equation and graph of a quadratic function.
3. be familiar with determining *x* and *y* intercepts of a quadratic function both algebraically and with the aid of the calculator.
4. be able to determine the roots of a quadratic function using the quadratic formula.
5. be familiar with the relationship between the discriminant of a quadratic function and the types of roots of the quadratic function.
6. be familiar with the vertex-form of a quadratic function.
7. be familiar with quadratic data having constant second differences.
8. be able to do quadratic regression on almost quadratic data.
9. understand sum-of-squares error and the quadratic function of best fit.

Lesson 5 - Power and Polynomial Functions

1. understand characteristics of the graphs of power functions.
2. interpret and apply the concept of direct variation as an example of a power function.
3. interpret and apply the concept of inverse variation.
4. determine if a function is a polynomial function.
5. state the degree of a polynomial function.
6. describe the end behavior of polynomial functions.

7. determine the intercepts of a polynomial function.
8. determine the domain and range of a polynomial function.
9. find the local maximum and local minimum points of a polynomial function.
10. find and use a cubic regression equation for a set of data.

Lesson 6 - Exponential Functions

1. understand the concept of exponential growth.
2. compute the growth factor of an exponential function and determine the growth rate.
3. understand the relationship between the growth factor and exponential growth or decline.
4. understand and apply the compound interest formulas for periodic and continuous compounding.
5. determine whether a set of data can be modeled by an exponential function and construct a model.
6. use an exponential function model.
7. determine which of two models is a better fit.
8. use exponential regression to determine an exponential function model.

Lesson 7 - Logarithmic Functions

1. understand the concept of a logarithmic function.
2. understand the concept of an inverse function.
3. write exponential statements in logarithmic form.
4. write logarithmic statements in exponential form.
5. evaluate logarithms using a calculator.
6. understand properties of logarithms.
7. solve exponential equations.
8. find and use a logarithmic regression equation for a set of data.

Lesson 8 - Piecewise-defined Functions

1. understand the concept of a piecewise-defined function.
2. work with piecewise-defined functions given by multiple formulas.
3. be able to graph piecewise-defined functions with the calculator.
4. be able to set up formulas for piecewise-defined functions.
5. be able to model data with piecewise-defined functions.

Academic Honesty

(Acknowledgment is hereby given to Georgia State University on whose policy this is based). As members of the academic community, all students are expected to recognize and uphold standards of intellectual and academic integrity. The University System of Georgia assumes as a basic and minimum standard of conduct in academic matters that students be honest and that they submit for credit only the products of their own efforts. Both the ideals of scholarship and the need for fairness require that all dishonest work be rejected as a basis for academic credit. They also require that students refrain from any and all forms of dishonorable or unethical conduct related to their academic work.

In an effort to foster an environment of academic integrity and to prevent academic dishonesty, students are expected to discuss with faculty the expectations regarding course assignments and standards of conduct. In addition, students are encouraged to discuss freely with faculty, academic advisers, and other members of the academic community any questions pertaining to the provisions of this policy.

Definitions and Examples

The examples and definitions given below are intended to clarify the standards by which academic honesty and academically honorable conduct are to be judged.

- Plagiarism
- Cheating on examinations
- Unauthorized Collaboration
- Falsification
- Multiple Submissions
- Evidence and Burden of Proof

The list is merely illustrative of the kinds of infractions that may occur, and it is not intended to be exhaustive. Moreover, the definitions and examples suggest conditions under which unacceptable behavior of the indicated types normally occurs. However, there may be unusual cases that fall outside these conditions that also will be judged unacceptable by the academic community.

Plagiarism

(NOTE: Plagiarism detection systems are often used by eCore faculty members. For example, see the following site: http://turnitin.com/en_us/training/student-training. Faculty is also advised to report violations to the eCore Administrative offices for investigation.)

Plagiarism is presenting another person's work as one's own. Plagiarism includes any paraphrasing or summarizing of the works of another person without acknowledgment, including the submitting of another student's work as one's own. Plagiarism frequently involves a failure to acknowledge in the text, notes, or footnotes the quotation of the paragraphs, sentences, or even a few phrases written or spoken by someone else.

The submission of research or completed papers or projects by someone else is plagiarism, as is the unacknowledged use of research sources gathered by someone else when that use is specifically forbidden by the instructor. Failure to indicate the extent and nature of one's reliance on other sources is also a form of plagiarism.

Finally, there may be forms of plagiarism that are unique to an individual discipline or course, examples of which should be provided in advance by the instructor. The student is responsible for understanding the legitimate use of sources, the appropriate ways of acknowledging academic, scholarly, or creative indebtedness, and the consequences of violating this responsibility.

Cheating on Examinations

Cheating on examinations involves giving or receiving unauthorized help before, during, or after an examination. Examples of unauthorized help include the use of notes, texts, "crib sheets," websites, electronic documents or notes, and computer programs during an examination (unless specifically approved by the instructor), or sharing information with another student during an examination (unless specifically approved by the instructor). Other examples include intentionally allowing another student to view one's own examination and forbidden collaboration before or after an examination.

Unauthorized Collaboration

Submission for academic credit of a work product, developed in substantial collaboration with other person or source but represented as one's own effort, is unauthorized. Seeking and providing such assistance is a violation of academic honesty. However, collaborative work specifically authorized by an instructor is allowed.

Falsification

It is a violation of academic honesty to misrepresent material or fabricate information in an academic exercise, assignment or proceeding. Some examples of falsification are:

- false or misleading citation of sources
- the falsification of the results of experiments or of computer data
- false or misleading information in an academic context in order to gain an unfair advantage.

Multiple Submissions

It is a violation of academic honesty to submit substantial portions of the same work for credit more than once without the explicit consent of the instructor(s) to whom the material is submitted for additional credit. In cases in which there is a natural development of research or knowledge in a sequence of courses, use of prior work may be desirable, or required. However, the student is responsible for indicating in writing, that the current work submitted for credit is cumulative in nature.

Evidence and Burden of Proof

In determining whether or not academic dishonesty has occurred, guilt must be proven by a preponderance of the evidence. This means that if the evidence that academic dishonesty occurred produces a stronger impression and is more convincing compared to opposing evidence, then academic dishonesty has been proven. In other words, the evidence does not have to be enough to free the mind from a reasonable doubt but must be sufficient to incline a reasonable and impartial mind to one side of the issue rather than to the other. Evidence, as used in this statement, can be any observation, admission, statement, or document that would either directly or circumstantially indicate that academic dishonesty has occurred. Electronic means may be used to monitor student work for the inappropriate use of the work of others.

Consult your eCore Student Guide at https://ecore.usg.edu/current-students/student-guide/policies-and-procedures#student-academic-dishonesty-procedures for further details on the eCore Academic Honesty Policy.