Algebra II

MAT-1100

2022   07/01/2022 to 06/30/2023   Modified 04/22/2022

🖥 Course Description

Algebra II is a math course that builds on the material covered in Algebra 1 with more detail and added subject matter. Beyond the basics of Algebra 1, this course develops skills related to linear systems in two and three dimensions, matrices, complex numbers, conic sections (their properties and equations), and a thorough study of trigonometric functions, graphs and identities. The student will be presented the material through video lessons, worksheets with answer keys, daily practice and animated examples. Building on the foundation of Algebra 1, the Student will expand his/her knowledge of functions including exponential, radical and logarithmic varieties.

◎ Rationale

In order to be successful in the present culture, one needs basic and complex mathematical skills when performing tasks that demand precision in calculations and problem solving. Algebra 2 explores applications and principles of mathematics and gives the students opportunities to practice using mathematic skills and formulas that are useful in the real world. By helping students to be prepared to work in a variety of occupations, Algebra 2 is invaluable to individuals in fields such as engineering, business, medicine, science, and other occupations.

Prerequisite

Algebra I or Geometry

📊 Measurable Learning Outcomes

A. The student will perform calculations and solve problems related to sets, real numbers, square roots, exponents, scientific notation and simplifying algebraic expressions.

B. The student will investigate functions and relations, including function notation, transformations, and parent functions.

C. The student will analyze and solve linear equations for possible roots through graphing and factoring.

D. The student will use graphs and algebraic methods to solve linear equations including curve fitting, linear inequalities, equations in three dimensions and with three variables.

E. The student will explore matrices and perform operations including multiplying, finding determinants, and solve systems of equations.

F. The student will investigate quadratic expressions and equations, solve for real and imaginary roots, and perform operations using real and complex numbers.

G. The student will investigate polynomials and solve by adding, multiplying, factoring and dividing polynomials and explore polynomial functions, models, and graphs.

H. The student will explore properties of exponential and logarithmic functions, work with variations, transformations of these functions and graph results.

I. The student will solve rational and radical expressions and equations including inequalities, investigate functional relationships and identify equations of conic section.

J. The student will investigate probability and statistics and solve a variety of problems involving measures of central tendencies, probabilities and arithmetic sequences.

K. The student will explore geometric sequences and series including mathematical induction and infinite geometric series.

📖 Course Resources

See LUOA's [Systems Requirements](#) for computer specifications necessary to operate LUOA curriculum. Also view [Digital Literacy Requirements](#) for LUOA's expectation of users' digital literacy.

This course makes use of third-party digital resources to enhance the learning experience. LUOA staff and faculty have curated these resources. Students can safely access them to complete coursework. Please ensure that internet browser settings, pop-up blockers, and other filtering tools allow for these resources to be accessed. See Technologies and Resources Used in this Course below for a specific list.

Note: Embedded YouTube videos may be utilized to supplement LUOA curriculum. YouTube videos are the property of the respective content creator, licensed to YouTube for distribution and user access. As a non-profit educational institution, LUOA is able to use YouTube video content under the YouTube Terms of Service. For additional information on copyright, please contact the [Jerry Falwell Library](#).

Materials Required for Purchase

The following materials are required in this course:

- Calculator (a graphing calculator would be best)
- Paper to work out problems
- Graph paper to graph equations and functions

Scripture Attribution

- Grades 7-12: All Scripture quotations, unless otherwise indicated, are from the ESV® Bible (The Holy Bible, English Standard Version®), copyright © 2001 by Crossway, a publishing ministry of Good News Publishers. Used by permission. All rights reserved. May not copy or download more than 500 consecutive verses of the ESV Bible or more than one half of any book of the ESV Bible."

Technologies and Resources Used in this Course

The following resource(s) are used throughout this course:

- Thinkwell

🏛 Policies

Students are accountable for all information in the [Student Handbook (https://www.liberty.edu/online-academy/wp-content/uploads/2021/11/LUOA-Student-Handbook.pdf)](https://www.liberty.edu/online-academy/wp-content/uploads/2021/11/LUOA-Student-Handbook.pdf). Below are a few policies
that have been highlighted from the Student Handbook.

Course Grading Policies

The student's grades will be determined according to the following grading scale and assignment weights. The final letter grade for the course is determined by a 10-point scale. Assignments are weighted according to a tier system, which can be referenced on the Grades page in Canvas. Each tier is weighted according to the table below. Items that do not affect the student's grade are found in Tier 0.

Grading Scale		Assignment Weights	
A	90-100%	Tier 0	0%
B	80-89%	Tier 1	25%
C	70-79%	Tier 2	35%
D	60-69%	Tier 3	40%
F	0-59%		

In order for students to receive credit for a course, the following conditions have to be met:

- All semester exams and module tests have to be completed.
- All Tier 3 projects or papers have to be completed.
- Fewer than 10 zeros exist in the gradebook for blank submissions in a full credit course and 5 zeros for blank submissions in a semester course.

Types of Assessments

To simplify and clearly identify which policies apply to which assessment, each assessment has been categorized into one of four categories: Lesson, Assignment, Quiz, or Test. Each applicable item on the course Modules page has been designated with an identifier chosen from among these categories. Thus, a Quiz on the American Revolution may be designated by the title, "1.2.W - Quiz: The American Revolution." These identifiers were placed on the Modules page to help students understand which Resubmission and Honor Code policies apply to that assessment (see the Resubmission Policy and Honor Code Policy below for further details).

- **Lesson:** *Any item on the Modules page designated as a "Lesson"*

  These include instructional content and sometimes an assessment of that content. Typically, a Lesson will be the day-to-day work that a student completes.

- **Assignment:** *Any item on the Modules page designated as an "Assignment"*

  Typical examples of Assignments include, but are not limited to, papers, book reports, projects, labs, and speeches. Assignments are usually something that the student should do his or her best work on the first time.

- **Quiz:** *Any item on the Modules page designated as a "Quiz"*

  This usually takes the form of a traditional assessment where the student will answer questions to demonstrate knowledge of the subject. Quizzes cover a smaller amount of material than Tests.

- **Test:** *Any item on the Modules page designated as a "Test"*

  This usually takes the form of a traditional assessment where the student will answer questions to demonstrate knowledge of the subject. Tests cover a larger amount of material than Quizzes.

Resubmission Policy

Students are expected to submit their best work on the first submission for every Lesson, Assignment, Quiz, and Test. However, resubmissions may be permitted in the following circumstances:

- **Lesson**: Students are automatically permitted two attempts on a Lesson. Students may freely resubmit for their first two attempts without the need for teacher approval.
- **Assignment**: Students should do their best work the first time on all Assignments. However, any resubmissions must be completed before the student moves more than one module ahead of that Assignment. For example, a student may resubmit an Assignment from Module 3 while in Module 4, but not an Assignment from Modules 1 or 2. High School students may not resubmit an Assignment without expressed written permission from the teacher in a comment.
- **Quiz**: Students may NOT resubmit for an increased grade.

- **Test**: Students may NOT resubmit for an increased grade.

If a student feels that he or she deserves a resubmission on a Lesson, Assignment, Quiz, or Test due to a technical issue such as a computer malfunction, the student should message his or her teacher to make the request.

Honor Code Policy

Every time a student violates the Honor Code, the teacher will submit an Honor Code Incident Report. The Student Support Coordinator will review the incident and allocate the appropriate consequences. Consequences, which are determined by the number of student offenses, are outlined below:

- **Warning:** This ONLY applies to high school Lessons and elementary/middle school Assignments and Lessons. Students should view these actions as learning opportunities.
  - **Lessons**: A zero will be assigned for the question only.
  - **Elementary/Middle School Assignment**: The student must redo his or her work; however, the student may retain his or her original grade.
- **1st Offense**:
  - **Lesson, Quiz, or Test**: The student will receive a 0% on the entire assessment.
  - **Assignment**: The student will either:
    - Receive a 0% on the original assignment
    - Complete the Plagiarism Workshop
    - Retry the assignment for a maximum grade of 80%
- **2nd Offense**: The student will receive a 0% and be placed on academic probation.
- **3rd Offense**: The student will receive a 0% and the Director of Faculty will determine the consequences that should follow, possibly including withdrawal from the course or expulsion from the academy.

Materials Selection Policy

LUOA curates educational materials that are consistent with the school's philosophy; however, the fallen human condition depicted in literature (as in Scripture itself) is not always pleasant. Valuable works sometimes have objectionable or profane elements. Good books provide four (4) recognized values.

- They build godly attitudes and character traits.
- They deepen our social and cultural awareness.
- They strengthen our use of written language.
- They provide a lifelong source of enjoyment and relaxation.

In order to instill these values in students and fulfill the stated objectives of the school, all LUOA students are expected to read and study good books on a regular basis. Recognizing that materials designed for one level may not be appropriate for another, three (3) levels of criteria are applied:

- Elementary materials must contain no objectionable material,
- Objectionable elements in sixth through eighth-grade materials must be limited and must serve a specific educational purpose, and
- Objectionable content may be included in high school materials but must be outweighed by positive literary, curricular, and/or Christian values.

The curriculum department has approved required educational materials for students.

📅 Schedule

Module 1: Foundations for Functions

Week 1: Properties and Operations

Week 2: Introduction to Functions

Week 3: More Functions and Module 1 Assessment

Module 2: Linear Functions

Week 4: Linear Equations and Inequalities

Week 5: Applying Linear Functions

Week 6: Applying More Functions and Module 2 Assessment

Module 3: Linear Systems

Week 7: Linear Systems in Two Dimensions

Week 8: Linear Systems in Three Dimensions

Week 9: Module 3 and Quarter 1 Assessments

Module 4: Matrices

Week 10: Matrix Operations

Week 11: Using Matrices to Solve Systems and Module 4 Assessment

Module 5: Quadratic Functions

Week 12: Quadratic Functions and Complex Numbers

Week 13: Applying Quadratic Functions

Week 14: More Quadratic Functions and Module 5 Assessment

Module 6: Polynomial Functions

Week 15: Operations with Polynomials

Week 16: Roots and Graphs of Polynomial Functions

Week 17: More Graphs of Polynomials

Week 18: Module 6 & Quarter 2 Assessments

Module 7: Exponential & Logarithmic Functions

Week 19: Exponential Functions and Logarithms

Week 20: Applying Exponential and Logarithmic Functions

Week 21: More Exponential and Logarithmic Functions and Module 7 Assessment

Module 8: Rational & Radical Functions

Week 22: Rational Functions

Week 23: Radical Functions

Week 24: More Radical Functions and Module 8 Assessment

Module 9: Properties & Attributes of Functions

Week 25: Functions and Their Graphs

Week 26: Functional Relationships

Week 27: Module 9 and Quarter 3 Assessments

Module 10: Conic Sections

Week 28: Understanding Conic Sections

Week 29: Applying Conic Sections

Week 30: Solving Nonlinear Systems and Module 10 Assessment

Module 11: Probability & Statistics

Week 31: Probability

Week 32: Data Analysis and Statistics

Week 33: More Statistics and Module 11 Assessment

Module 12: Sequences and Series

Week 34: Exploring Arithmetic Sequences and Series

Week 35: Exploring Geometric Sequences and Series

Week 36: Module 12 and Quarter 4 Assessments