LIBERTY UNIVERSITY | ONLINE ACADEMY

Algebra II - Enhanced
MAT1100

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.

Enhanced Courses

LUOA Enhanced Courses provide additional student support through increased interaction and communication with the course instructor. Interaction takes place through:

- Weekly live teaching sessions
- Q&A conference with teacher before each test
- Discussion boards

Participation Grade

Students are given a participation grade based on attendance during the teacher live sessions and participation in discussion boards. For full year courses, there are 20 teacher live sessions and four discussion boards. Semester courses have 10 live sessions and two discussion boards. Participation grades are given at the end of each semester and count as a Tier 3 assignment.

Semester Grade Participation:

Grade	Participation
A	Attended 8–10 teacher live sessions, participated in two discussion boards
B	Attended 6–7 teacher live sessions, participated in two discussion boards
C	Attended 5 teacher live sessions, participated in two discussion boards
D	Attended 3–4 teacher live sessions, participated in one discussion board
F	Attended 0–3 live teacher sessions, participated in zero discussion boards

Late Policy

In order to take full advantage of our Enhanced courses, it is important that students stay on track with their scheduled assignments so that they benefit from the discussions with their teacher and classmates. Meeting deadlines is a skill that will aid students in their high school classes and beyond. Enhanced courses offer LUOA students help in developing this skill by requiring assignments to be turned in by the due date in order to receive full-credit. For each

day the assignment is not submitted, 5 percent will be deducted from the assignment grade with a maximum deduction of 20 percent.

Exceptions to this late policy may be considered in cases of illness, travel, or unforeseen events. Students will need to contact their teacher to seek approval for any exception.

Semester and Final Exams Proctored

The proctoring of the semester and/or final exam by a parent/guardian or other adult is required for Enhanced Courses. A form is provided in the course that the proctor will sign and complete. The student will then upload the form into an assignment before being able to begin the exam.

Course Materials

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

Technologies and Resources Used in this Course

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

- Thinkwell

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:

1. All semester exams and module tests have to be completed,
2. All Tier 3 projects or papers have to be completed, and
3. 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.

Course Policies

Students are accountable for *all* information in the Student Handbook. Below are a few policies that have been highlighted from the Student Handbook.

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 Honor Code and Resubmission policies apply to that assessment (see the Honor Code and Resubmission policies on the pages that follow 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, and that request will need to be approved by a Department Chair.

Consequences for Violations to the Honor Code

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 Faculty Chair will determine the consequences that should follow, possibly including withdrawal from the course or expulsion from the academy.

Scope and Sequence

Algebra II

Module 1: Functions, Linear Equations, and Inequalities

Week 1: Properties and Operations
Week 2: Introduction to Functions
Week 3: Linear Equations, Inequalities, and Functions
Week 4: Writing and Graphing Linear Functions and Inequalities

Module 2: Absolute Value, Linear Systems, and Matrices

Week 5: Linear Models and Absolute-Value Equations, Inequalities and Functions
Week 6: Linear Systems in Two Dimensions
Week 7: Applying Linear Systems and Systems in Three Dimensions
Week 8: Matrix Operations

Module 3: Determinants, Quadratic Functions, and Complex Numbers

Week 9: Using Matrices to Solve Systems
Week 10: Quadratic Functions
Week 11: Solving Quadratic Equations and Inequalities
Week 12: Quadratic Models and Complex Numbers

Module 4: Polynomials and Synthetic Division

Week 13: Operations with Polynomials
Week 14: Factoring and Dividing Polynomials
Week 15: Synthetic Division and Real Roots of Polynomials
Week 16: Fundamental Theorem of Algebra and Graphing Polynomials

Module 5: Polynomial Functions/Models and Semester Exam

Week 17: Polynomial Functions/Models
Week 18: Semester Review and Exam

Module 6: Exponential, Logarithmic, and Variation Functions

Week 19: Exponential and Logarithmic Functions
Week 20: Exponential and Logarithmic Equations
Week 21: The Natural Base and Graphs of Exponential and Logarithmic Functions
Week 22: Variation Functions and Multiplying and Dividing Rational Expressions

Module 7: Rational Functions and Rational Equations

Week 23: Rational Expressions and Functions
Week 24: Radical Expressions and Solving Rational Equations and Inequalities
Week 25: Radical Equations, Inequalities, and Functions
Week 26: Functions and Their Graphs

Module 8: Functional Relationships and Conic Sections

Week 27: Functional Relationships
Week 28: Conic Sections: Circles and Ellipses
Week 29: Conic Sections: Hyperbolas and Parabolas
Week 30: Applying Conic Sections

Module 9: Probability, Data Analysis, and Arithmetic Sequences

Week 31: Introduction to Probability
Week 32: Independent, Dependent Events, and Compound Events
Week 33: Data Analysis and Statistics
Week 34: Arithmetic Sequence and Series

Module 10: Geometric Sequences and Semester Exam

Week 35: Geometric Sequences
Week 36: Semester Review and Exam