Algebra II - Enhanced

MAT1105

Course Description
Algebra 2 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. Perform calculations and solve problems related to sets, real numbers, square roots, exponents, scientific notation and simplifying algebraic expressions
B. Investigate functions and relations, including function notation, transformations, and parent functions
C. Analyze and solve linear equations for possible roots through graphing and factoring
D. Use graphs and algebraic methods to solve linear equations including curve fitting, linear inequalities, equations in three dimensions and with three variables
E. Explore matrices and perform operations including multiplying, finding determinants, and solve systems of equations
F. Investigate quadratic expressions and equations, solve for real and imaginary roots, and perform operations using real and complex numbers
G. Investigate polynomials and solve by adding, multiplying, factoring and dividing
polynomials and explore polynomial functions, models, and graphs
H. Explore properties of exponential and logarithmic functions, work with variations,
transformations of these functions and graph results
I. Solve rational and radical expressions and equations including inequalities, investigate
functional relationships and identify equations of conic section
J. Investigate probability and statistics and solve a variety of problems involving measures
of central tendencies, probabilities and arithmetic sequences
K. 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:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Participation</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Attended 8-10 teacher live sessions, participated in two discussion boards</td>
</tr>
<tr>
<td>B</td>
<td>Attended 6-7 teacher live sessions, participated in two discussion boards</td>
</tr>
<tr>
<td>C</td>
<td>Attended 5 teacher live sessions, participated in two discussion boards</td>
</tr>
<tr>
<td>D</td>
<td>Attended 3-4 teacher live sessions, participated in one discussion board</td>
</tr>
<tr>
<td>F</td>
<td>Attended 0-3 live teacher sessions, participated in zero discussion boards</td>
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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.

The student will need a calculator (a graphing calculator would be best), paper to work out problems, and graph paper to graph equations and functions.

This course makes use of third-party digital resources to enhance the learning experience. These resources have been curated by LUOA staff and faculty and can be safely accessed by students to complete coursework. Please ensure that internet browser settings, pop-up blockers, and other filtering tools allow for these resources to be accessed.

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

- ThinkWell

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 education institution, LUOA is able to use YouTube video content under the YouTube Terms of Service and the provisions of the TEACH Act of 2001. For additional information on copyright, please contact the Jerry Falwell Library.

Course Grading Policies

The students’ 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.

<table>
<thead>
<tr>
<th>Grading Scale</th>
<th>Assignment Weights</th>
</tr>
</thead>
<tbody>
<tr>
<td>A  90-100%</td>
<td>Tier 0  0%</td>
</tr>
<tr>
<td>B  80-89%</td>
<td>Tier 1  25%</td>
</tr>
<tr>
<td>C  70-79%</td>
<td>Tier 2  35%</td>
</tr>
<tr>
<td>D  60-69%</td>
<td>Tier 3  40%</td>
</tr>
<tr>
<td>F  0-59%</td>
<td></td>
</tr>
</tbody>
</table>

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, “1.2.3 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 to 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 their 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. The student may freely resubmit for their first two attempts without the need for teacher approval.

- **Assignment:** Students are intended to 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 computer malfunctioning, 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 offences, are outlined below:

- **Warning:** This ONLY applies to high school Lessons and elementary/middle school Assignments and Lessons. These will be taken as a teaching moment for the student.
  - **Lessons:** A zero will be assigned for the question only.
  - **Elementary/Middle School Assignment:** The student must redo their work. However, they may retain their original grade.

- **1st Offense:**
  - **Lesson, Quiz, or Test:** The student will receive a zero 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 max grade of 80%

- **2nd Offense:** The student will receive a zero and be placed on Academic Probation.

- **3rd Offense:** The student will receive a zero 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