

## Pre Calculus - Enhanced

**MAT1200**

### Course Description

Pre-Calculus will begin with a review of essential algebraic concepts such as exponents, radicals, polynomials, factoring, and complex numbers. The student will then study material related to trigonometric identities, systems of equations and matrices, and graphing everything from linear and quadratic functions to vectors and polar coordinates. Concepts such as absolute value, synthetic division, and radical expressions will be coupled with real applications of trigonometric functions, combinations and probability. As the material is presented through video lectures and illustrations, the student will be given opportunity to practice learned skills and explore topics such as limits, differentiation and integration.

### Rationale

Pre-Calculus takes the student beyond the rigors of Geometry and Algebra 2 to new uses of math principles. It is important for students to learn how basic quadratics and functions can produce more complicated mathematical operations and calculations. By exploring uses of sines and cosines, practical applications involving vectors and matrices can be used to make math a tool for solving problems beyond simple four operation calculations.

### Prerequisite

Algebra II and Geometry

### Measurable Learning Outcomes

- A. The student will review basic principles of algebra including exponents, factoring and solving algebraic equations.
- B. The student will practice using algebraic principles to graph and solve problems involving points on the coordinate plane.
- C. The student will find the solution sets for inverse functions, explore operations with complex numbers, and use exponential models and natural exponential functions.
- D. The student will further study properties of logarithms and solve exponential and logarithmic equations using a variety of methods.
- E. The student will explore the attributes and equations of conic sections and use proven algebraic principles to solve and graph conic sections.
- F. The student will use trigonometric functions to solve problems across the coordinate plane including sines, cosines, tangents, cotangents, secants and cosecants.

- G. The student will be introduced to a variety of trig identities and apply them in solving trigonometric problems including sums, differences, double and half angle formulas.
- H. The student will explore and use the law of sines and the law of cosines, vectors and complex numbers, and solve systems of linear equations.
- I. The student will investigate determinants, inverses of matrices, polar coordinates, and solve problems using principles of arithmetic and geometric sequences.
- J. The student will calculate probability using the fundamental counting principle, permutations and combinations.

## 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](#).

## 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

## Pre-Calculus

### **Module 1: Exponents, Factoring and Solving Equations**

Week 1: Basic Algebra Review  
Week 2: Rational Exponents, Radicals and Polynomials  
Week 3: Factoring and Rational Expressions  
Week 4: Solving Equations and Complex Numbers

### **Module 2: Circles, Slope and Functions**

Week 5: Coordinates, Intercepts, and Circles  
Week 6: Slope and Equations of Lines  
Week 7: Functions and Graphs of Functions  
Week 8: Transformations and Combinations of Functions

### **Module 3: Quadratic, Polynomial and Exponential Functions**

Week 9: Inverse and Quadratic Functions  
Week 10: Polynomial Functions  
Week 11: Real Zeros, Complex Zeros, and the Fundamental Theorem of Algebra  
Week 12: Exponential Functions

### **Module 4: Properties of Logarithms and Graphing Rational Functions**

Week 13: Logarithmic Functions  
Week 14: Properties of Logarithms, Solving Exponential and Logarithmic Equations  
Week 15: Exponential & Logarithmic Models  
Week 16: Graphing Rational Functions

### **Module 5: Conic Sections**

Week 17: Conic Sections  
Week 18: Semester Review and Exam

### **Module 6: Sines, Cosines and Other Trigonometric Functions**

Week 19: Angles and Their Measure and Right Angle Trigonometry  
Week 20: Trigonometric Functions in the Coordinate Plane and Unit Circle Trigonometry  
Week 21: Graphing Sine and Cosine Functions  
Week 22: Graphing Other Trigonometric Functions

### **Module 7: Trigonometric Identities, Equations and Formulas**

Week 23: Inverse Trigonometric Functions and Applications of Trigonometric Functions  
Week 24: Fundamental Trigonometric Identities  
Week 25: Solving Trigonometric Equations  
Week 26: The Sum, Difference, Double-Angle, Half-Angle, and Power-Reducing Formulas

### **Module 8: Laws of Sines and Cosines, Vectors and Matrices**

Week 27: The Law of Sines and the Law of Cosines  
Week 28: Vectors and Complex Numbers  
Week 29: Solving Systems of Linear Equations  
Week 30: Matrices and Systems of Equations

### **Module 9: Determinants, Analytic Geometry and Sequences**

Week 31: Determinants and Inverses of Matrices  
Week 32: Analytic Geometry  
Week 33: Arithmetic Sequences  
Week 34: Geometric Sequences and Mathematical Induction

### **Module 10: Probability**

Week 35: Counting Principles and Probability  
Week 36: Semester Review and Exam