LIBERTY UNIVERSITY | *Online Academy*

Geometry
MAT1000

Course Description

Geometry combines the skills of algebraic thinking with the abstract concepts of plane geometry to give the student a good foundation in mathematical logical thinking and the skills needed to develop sequential proofs. The material includes the exploration and practice of inductive and deductive reasoning, the Pythagorean Theorem, properties and principles related to polygons, and a more detailed look at trigonometric ratios. As the student is presented material through video lectures and practice, he/she will become more familiar with constructions, the measurement of angles, and relationships such as similarity and congruency.

Rationale

Geometry is a very abstract yet practical study of theoretical and applicable mathematical principles and properties. It includes logic and reasoning, proofs and theorems, and applications for daily living and work. Geometry is based on ideas that deal with spatial relationships that can be used to solve real life problems implementing proven angle theorems and equations. Geometry builds upon basic mathematics previously learned in Algebra 1 and helps prepare the student for Algebra 2 and further math and science courses.

Prerequisite

Algebra I

Measurable Learning Outcomes

A. The student will explore properties of the coordinate plane and use inductive and deductive reasoning to solve mathematical proofs and problems.
B. The student will discover the properties of linear equations and the relationship of the slope to parallel and perpendicular lines while considering the y-intercept form.
C. The student will use given properties and logical reasoning in order to prove triangle congruence and coordinate point calculations.
D. The student will manipulate the properties of triangles and proven theorems in order to solve for unknown values.
E. The student will investigate principles that distinguish special quadrilaterals and related computations.
F. The student will explore trigonometric functions and similarity of triangles and other geometric shapes.

G. The student will use given formulas for calculating perimeter, area of geometric shapes and geometric probability.
H. The student will calculate the surface area and volume of three-dimensional figures given the corresponding formulas.
I. The student will investigate the properties and calculations associated with circles and transformations across the coordinate plane.
J. The student will observe patterns existing in geometric functions and use established rules to solve for unknowns.

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.

	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%		

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

Geometry

Module 1: Coordinate Plane, Inductive/Deductive Reasoning and Mathematical Proofs

Week 1: Points, Lines, Planes and Angles
Week 2: Introduction to the Coordinate Plane
Week 3: Inductive and Deductive Reasoning
Week 4: Mathematical Proof

Module 2: Parallel/Perpendicular, Slope Intercept and Point-Slope

Week 5: Planes, Lines, Angles, Parallel Lines and Transversals
Week 6: Properties of Perpendicular Lines and Proving Lines are Parallel
Week 7: Slope and Slope Intercept Form
Week 8: Point-Slope Form, Slopes of Parallel and Perpendicular Lines

Module 3: Proving Triangles, Congruence, and coordinate Proofs

Week 9: Triangles and Congruence
Week 10: Proving Triangle Congruence
Week 11: Coordinate Proofs
Week 12: Segments in Triangles

Module 4: Triangle Inequalities, the Pythagorean Theorem and Parallelograms

Week 13: Indirect Proofs and Inequalities in Triangles
Week 14: The Pythagorean Theorem and Special Right Triangles
Week 15: Polygons and Properties of Parallelograms
Week 16: Special Parallelograms

Module 5: Special Quadrilaterals

Week 17: Special Quadrilaterals
Week 18: Semester Review and Exam

Module 6: Similarity and Trigonometric Ratios

Week 19: Similarity Relationships
Week 20: Applying Similarity
Week 21: Trigonometric Ratios
Week 22: Applying Trigonometric Ratios

Module 7: Formulas for Polygons, Perimeter/Area, and Geometric Probability

Week 23: Developing Formulas for Polygons
Week 24: Formulas for Circles, Regular Polygons and Composite Figures
Week 25: Applying Geometric Formulas
Week 26: Geometric Probability

Module 8: Surface Area and Volume of Three-Dimensional Figures

Week 27: Three-Dimensional Figures
Week 28: Surface Area
Week 29: Volume
Week 30: Spheres

Module 9: Circles and Transformations

Week 31: Lines and Arcs in Circles
Week 32: Angles in Circles
Week 33: Segments in Circles
Week 34: Congruence Transformations

Module 10: Patterns

Week 35: Patterns
Week 36: Semester Review and Exam