

Cincinnati Christian University
Math 120 99 Geometry and Measurement (Online)
Fall 2019 | 3 semester credit hours

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Foster School of Biblical Studies, Arts & Sciences

Cincinnati Christian University exists to educate men and women to live by Biblical principles and transformed lives, empowering them with character, skills, insight, and vision to advance the kingdom and impact society for Christ. CCU is committed to providing a Christ-centered, liberal arts education taught with a Christian worldview in students' chosen fields of study.

Course Description

Inductive and deductive reasoning; sets; the study of two- and three-dimensional geometry; transformations, the coordinate plane; and measurement with standard and nonstandard units.

Prerequisite: Satisfactory performance on a placement examination or successful completion of MATH 010.

Course Rationale

Since some understanding of mathematics will enhance the study of every discipline, as well as develop skill in mathematical reasoning and competence in real world situations, this class will be particularly relevant to an informed and aware Christian citizenry.

Learning Objectives (connected to Arts & Sciences Outcome #4 below):

Students will...

1. use multiple problem solving strategies.
2. understand and apply numerical computation, mental math, and estimation techniques.
3. understand and apply the process of measurement to solve problems.
4. use geometric definitions, postulates, and theorems to describe, contrast, and reason.
5. communicate mathematical ideas in written and oral form, using every day and mathematical language between student and student and between student and instructor.
6. make connections among ideas in mathematics, and connect mathematics to other disciplines and real world situations.

Arts & Sciences Departmental Outcomes

CCU's Arts & Sciences program is designed to prepare students to...

1. communicate effectively in both oral and written forms in a variety of rhetorical contexts, including Standard English,
2. adeptly utilize modern research and writing tools,
3. identify decisive events and ideas in the human experience and assess their influences on modern culture and thought,
4. employ critical and creative thinking and mathematic and scientific principles for problem solving, literary and socio-cultural analysis, intercultural understanding, and research in the sciences and humanities,
5. demonstrate the integration of academic insights and experiences by constructing and employing a personal framework in which ethical decisions can be made in light of societal values and a Christian worldview.

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Required Materials

(You need to purchase both a textbook and a license for Geometer's Sketchpad.)

Textbook - *College Geometry: Using the Geometer's Sketchpad, 1st Edition*. Barbara E. Reynolds; William E. Fenton. Wiley, 2012. ISBN-10: 0470534931

Geometer's Sketchpad - To purchase a license for the Geometer's Sketchpad software, call the McGraw Hill Customer Service team at 800-338-3987. Explain that you are a student in a geometry course and need an individual Geometer's Sketchpad license. A one-year license should cost \$10.56. If you need to chat with a customer service representative about the purchase or at any time during the semester to ask further questions about your software/license, you can use the phone number above or the resources provided at <http://mheducation.com/customerservice>. (There is a chat box in the bottom right corner that says, "Have a question?" Click that box and type your question when prompted.)

Grading Policy

Letter grades will be assigned based on the published grade point system in the CCU Academic Catalog. Grades will be comprised of the following:

Final Exam	20%
Textbook Activities & Exercises	50%
Additional Assignments	30%

Assignments

Activities and exercises will be assigned from the textbook for each chapter. Additional graded and ungraded assignments will be given throughout the course to help students understand and apply major course concepts. Further details will be posted on Canvas weekly.

Late Assignments

An assignment will be considered late if it is not submitted by the date/time on which it is due. In general, late assignments will receive a 0. Assignments that are late due to severe illness or an emergency situation may be accepted only if a student has appropriate documentation. If you are traveling for a school-related activity or any other reason, you should plan to submit your assignments in advance of the trip. Late assignments due to travel, school activities, or any other planned/scheduled event will not be accepted unless a student has made mutually agreed upon arrangements with Dr. Bedi at least two days in advance of the deadline.

Academic Integrity

Any work submitted must be your own. This class will follow CCU's regulations pertaining to academic integrity. A copy may be found in CCU's Student Handbook and Course Catalog.

Disability Services: Students who require academic accommodations due to a documented physical, psychological, or learning disability may request assistance from the Student Services Department. Students are encouraged to complete this process within the first two weeks of the semester. The Student Services Department is located on the upper level of Presidents Hall. You may also contact the office by phone at 244-8150.

Attendance

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You are expected to be active on Canvas and submit assignments weekly during the course. Attendance will be taken every week based on assignment submission. Students who submit at least one assignment for the week will be counted "present." Students who do not submit any assignments for the week will be counted "absent." Two absences are allowed in the course. (Note that while two absences are allowed, students will still receive 0's for any work that is not submitted by the due date.) After exceeding two absences, students will be dropped from the course and will receive a grade of FA (failure due to absence). Students are required to keep records of each absence. Students applying for reinstatement after being dropped from the course must submit documentation about each absence to the Registrar's Office. Whether a student can be reinstated in a course is decided by a university-level attendance committee, not by the course instructor.

Course Outline

The course will be organized by modules and weeks (see outline below). As we progress through the semester, you will be able to access all the details and materials for each module on Canvas. I will post specific instructions regarding assignments one week at a time. To find the current week's instructions and assignments, login to Canvas > click on the Geometry course > and click "Home." A screen will appear with each week's work in order from the first week of class (top) to the most current week (bottom).

Fall 2019 Course Outline*
<p style="text-align: center;">Week of August 19 Course Introduction</p> <p>The purpose of this course introduction section is to better orient you to this online geometry course.</p> <ul style="list-style-type: none"> • Read the syllabus in detail for yourself. It is important to orient yourself with the general objectives and expectations of the course. The syllabus serves as a "contract" between the student and the instructor. If you don't understand any of the course policies (especially related to assignments and attendance), please ask questions to gain clarity early on. • Complete Assignment 1: Course Intro on Canvas by Monday, August 26 to verify you have read the syllabus and understand the course expectations as outlined in the syllabus, ask any questions you may have, and to help me learn more about you so that I can better serve you this semester. • Make sure that you have bought or rented a textbook that will arrive in plenty of time as well as have purchased a license for Geometer's Sketchpad to complete and submit Chapter 1's work by the September 9 deadline • Meet with Dr. Bedi if your location allows to ensure you understand the course requirements, know how to use the Canvas platform to find the course materials, and know how to purchase/install/use Geometer's Sketchpad. (I will e-mail you during the first week of the semester to see if you are available for a brief meeting at my office on campus.)
<p style="text-align: center;">Week of August 26 & September 2 Chapter 1: Using the Geometer's Sketchpad; Exploring & Conjecturing</p> <ul style="list-style-type: none"> • Sketchpad Tips • Constructing, Exploring, Conjecturing, & Inductive Reasoning • Language of Geometry • Explorations, Observations, Questions • Family of Quadrilaterals • Angles Inscribed in Circles • Rules of Logic
<p>Week of September 9 & September 16</p>

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Chapter 2: Constructing & Proving

- Euclid's Postulates
- Congruence & Similarity
- Constructions
- Geometric Language Revisited
- Conditional Statements: Implication
- Using Robust Constructions to Develop a Proof
- Angles and Measuring Angles
- Constructing Perpendicular and Parallel Lines
- Properties of Triangles
- Euclid's Parallel Postulate
- Euclid's Constructions in the *Elements*
- Ideas About Betweenness

Week of September 23 & September 30

Chapter 3: Mathematical Arguments & Triangle Geometry

- Deductive Reasoning
- Universal & Existential Quantifiers
- Negating a Quantified Statement
- Direct Proof & Disproof by Counterexample
- Step-by-Step Proofs
- Congruence Criteria for Triangles
- The Converse & the Contrapositive
- Concurrence Properties for Triangles
- Ceva's Theorem & Its Converse
- Brief Excursion into Circle Geometry
- The Circumcircle of Triangle ABC

Week of October 7 & October 14

Chapter 4: Circle Geometry & Proofs

- Axiom Systems: Ancient & Modern Approaches
- Language of Circles
- Inscribed Angles
- Mathematical Arguments
- Additional Methods of Proof
- Cyclic Quadrilaterals
- Incircles & Excircles

Week of October 21 & October 28

Chapter 5: Analytic Geometry & Chapter 6: Taxicab Geometry

- Points
- Lines
- Distance
- Using Coordinates in Proofs
- An Axiom System for Metric Geometry
- Circles
- Ellipses
- Measuring Distance from a Point to a Line
- Hyperbolas

Week of November 4 & November 11

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Chapter 8: Transformational Geometry
<ul style="list-style-type: none">• Transformations• Isometries• Other Transformations• Composition of Isometries• Inverse Isometries• Using Isometries in Proofs• Isometries in Space
Week of November 18 & December 2 Chapter 10: Symmetry in the Plane
<ul style="list-style-type: none">• Symmetries• Groups of Symmetries• Classifying Figures by Their Symmetries• Friezes & Symmetry• Wallpaper Symmetry• Tilings
Week of December 9: Final Exam

**The instructor reserves the right to change or amend any part of this course plan as deemed necessary.*