



NEW JERSEY CENTER  
FOR TEACHING & LEARNING

## **MATH-6433: Learning and Teaching Geometry**

**Course Credit:** 4.0 NJCTL credits

### **Dates & Times:**

This is a 4-credit, self-paced course, covering 13 modules of content. The exact number of hours that you can expect to spend on each module will vary based upon the module coursework, as well as your study style and preferences. You should plan to spend 12-20 hours per module, completing the module slides, readings, short answer assignments, labs, mastery exercises, practice problems, and module exams.

**Graduate Student Handbook:** <https://njctl.org/graduate-handbook/>

### **COURSE DESCRIPTION:**

This course is for teachers who intend to become middle school and/or high school mathematics teachers. This is a proof-based course that requires teachers to develop skills in writing deductive geometric proofs. It provides teachers with the background knowledge, at an introductory college level, of Euclidean Geometry and applies that knowledge when writing proofs and problem solving. While the focus will be on two-column proofs, there will be some exposure to other types of proof.

This course includes topics taken from the middle school and high school Common Core State Standards for Mathematics (CCSS) and the New Jersey State Standards for Mathematics. The focus is the conceptual development of points, lines, planes, angles & proofs and their application to the understanding of triangles, similar triangles & trigonometry, congruent triangles, circles, analytic geometry, transformations, quadrilaterals, area, volume, and probability.

### **STUDENT LEARNING OUTCOMES:**

Upon completion of the course, the student will be able to:

1. Apply the basic principles of Euclidean Geometry in the areas of the points, lines, planes, angles, proofs, parallel lines, triangles, similar triangles, trigonometry, congruent triangles, analytic geometry, transformations, quadrilaterals, area of figures, surface area, volume, and probability.
2. Apply student-centered pedagogy to teach mathematics to students.
3. Apply basic mathematical tools commonly used in geometry including inverse operations and problem solving.
4. Apply basic mathematical tools commonly used in geometry including skills in writing deductive geometric proofs and performing geometric constructions.
5. Identify, understand, and communicate the elements, representations, and models of equations to solve geometric problems.

6. Examine, investigate, and assess the relationships between various geometric models and their variables.

## **TEXTS, READINGS, INSTRUCTIONAL RESOURCES:**

### **Required Texts:**

- This course uses a free digital text book accessible at: <https://njctl.org/courses/math/geometry/>
- Participants will download SMART Notebook presentations, homework files, labs, and teacher resources from the PMI Geometry course

### **Recommended Readings:**

- Related articles within discussion prompts

## **COURSE REQUIREMENTS:**

Consistent attendance in your online courses is essential for your success. Failure to verify your attendance within the first 7 days of this course may result in your withdrawal. If for some reason you would like to drop a course, please contact the Dean of Students.

Online classes have assignments and participation requirements just like on-campus classes. Budget your time carefully. If you are having technical problems, problems with your assignments, or other problems that are impeding your progress, let your instructor know as soon as possible.

## **GRADE DISTRIBUTION AND SCALE:**

In order to receive a Passing grade, the participant must complete the following course requirements: all short answer assignments, mastery exercises, labs, exams, and the reflection paper outlined in the *Assignments* section of the Class Schedule (below).

### **Grade Distribution:**

Module Exams	70%
Final Exam	10%
Labs	6%
Short Answer Assignments	6%
Mastery Exercises	6%
Reflection Paper	2%

### **Grade Scale:**

A	93 – 100
A-	90 – 92
B+	86 – 89
B	83 – 86
B-	80 – 82
C+	77 – 79
C	73 – 76
C-	70 – 72

D	60.0 – 69.9
F	59.9 or below

**ACADEMIC STANDING:**

NJCTL has established standards for academic good standing within a student’s academic program. Students enrolled in any NJCTL online course must receive an 80 or higher to successfully complete a course and receive credit for that course. An 80 is equivalent to a GPA of 2.7 or B-. Additionally, students in an endorsement program must receive a cumulative GPA of 3.0 for all courses combined in order to successfully complete the program.

**ACADEMIC INTEGRITY:**

Students must assume responsibility for maintaining honesty in all work submitted for credit and in any other work designated by the instructor of the course. Academic dishonesty includes cheating, fabrication, facilitating academic dishonesty, plagiarism, reusing /re-purposing your own work, unauthorized possession of academic materials, and unauthorized collaboration.

**CITING SOURCES WITH APA STYLE:**

All students are expected to follow proper writing and APA requirements when citing in APA (based on the APA Style Manual, 6th edition) for all assignments.

**DISABILITY SERVICES STATEMENT:**

We are committed to providing reasonable accommodations for all persons with disabilities. Any student with a documented disability requesting academic accommodations should contact the Dean of Students, Dr. Jamie Korn, additional information to coordinate reasonable accommodations for students with documented disabilities ([Jamie@njctl.org](mailto:Jamie@njctl.org)).

**NETIQUETTE:**

Respect the diversity of opinions among the instructor and classmates and engage with them in a courteous, respectful, and professional manner. All posts and classroom communication must be conducted in accordance with the student code of conduct. Think before you push the Send button. Did you say just what you meant? How will the person on the other end read the words?

Maintain an environment free of harassment, stalking, threats, abuse, insults or humiliation toward the instructor and classmates. This includes, but is not limited to, demeaning written or oral comments of an ethnic, religious, age, disability, sexist (or sexual orientation), or racist nature; and the unwanted sexual advances or intimidations by email, or on discussion boards and other postings within or connected to the online classroom.

If you have concerns about something that has been said, please let your instructor know.

## CLASS SCHEDULE:

Module	Required Readings	• Assignments
<b>1 – Points, Lines, &amp; Planes</b>	<ul style="list-style-type: none"> <li>PDFs of presentations within the module.</li> </ul>	<ul style="list-style-type: none"> <li>Short Answer</li> <li>Lab</li> <li>Mastery Exercise</li> <li>Module Exam</li> </ul>
<b>2 – Angles</b>	<ul style="list-style-type: none"> <li>PDFs of presentations within the module.</li> </ul>	<ul style="list-style-type: none"> <li>Short Answer</li> <li>Lab</li> <li>Mastery Exercise</li> <li>Module Exam</li> </ul>
<b>3 – Parallel Lines</b>	<ul style="list-style-type: none"> <li>PDFs of presentations within the module.</li> </ul>	<ul style="list-style-type: none"> <li>Short Answer</li> <li>Lab</li> <li>Mastery Exercise</li> <li>Module Exam</li> </ul>
<b>4 – Triangles</b>	<ul style="list-style-type: none"> <li>PDFs of presentations within the module.</li> </ul>	<ul style="list-style-type: none"> <li>Short Answer</li> <li>Lab</li> <li>Mastery Exercise</li> <li>Module Exam</li> </ul>
<b>5 – Similar Triangles &amp; Trigonometry</b>	<ul style="list-style-type: none"> <li>PDFs of presentations within the module.</li> </ul>	<ul style="list-style-type: none"> <li>Short Answer</li> <li>Lab</li> <li>Mastery Exercise</li> <li>Module Exam</li> </ul>
<b>6 – Congruent Triangles</b>	<ul style="list-style-type: none"> <li>PDFs of presentations within the module.</li> <li>Article embedded in discussion</li> </ul>	<ul style="list-style-type: none"> <li>Short Answer</li> <li>Lab</li> <li>Mastery Exercise</li> <li>Module Exam</li> </ul>
<b>7 – Quadrilaterals</b>	<ul style="list-style-type: none"> <li>PDFs of presentations within the module.</li> </ul>	<ul style="list-style-type: none"> <li>Short Answer Assignment</li> <li>Lab</li> <li>Mastery Exercise</li> <li>Module Exam</li> </ul>
<b>8 – Circles</b>	<ul style="list-style-type: none"> <li>PDFs of presentations within the module.</li> </ul>	<ul style="list-style-type: none"> <li>Short Answer</li> <li>Lab</li> <li>Mastery Exercise</li> <li>Module Exam</li> </ul>
<b>9 – Transformations</b>	<ul style="list-style-type: none"> <li>PDFs of presentations within the module.</li> </ul>	<ul style="list-style-type: none"> <li>Short Answer Assignment</li> <li>Lab</li> <li>Mastery Exercise</li> <li>Module Exam</li> </ul>

<b>10 – 3D Geometry</b>	<ul style="list-style-type: none"><li>• PDFs of presentations within the module.</li></ul>	<ul style="list-style-type: none"><li>• Short Answer Assignment</li><li>• Lab</li><li>• Mastery Exercise</li><li>• Module Exam</li></ul>
<b>11 – Reflection &amp; Final Exam</b>	N/A	<ul style="list-style-type: none"><li>• Reflection Paper</li><li>Final Exam</li></ul>