

# GEOMETRY AND MEASUREMENT

MATH 226 | SPRING QUARTER 2018

## **INSTRUCTOR:**

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## **COURSE OVERVIEW:**

The foundation of every activity will be mathematical problem solving and reasoning. Specific content will include concepts and procedures of geometry and measurement.

## **COURSE RATIONALE:**

To meet the expectations for mathematics education for elementary teachers a shift in content, instructional and assessment practices are crucial. The Curriculum and Evaluation Standards of School Mathematics (NCTM, 2000) outlines the specific changes needed in pre-service mathematics education. “Prospective teachers must be taught in a manner similar to how they are to teach--by exploring, conjecturing, communicating, reasoning, and so forth.” In addition, “all teachers need an understanding of both the historical development and current application of mathematics. Furthermore, they should be familiar with the power of technology.” This course is designed to address these changes in mathematics education and prepare preservice elementary teachers with the necessary mathematical content to implement the different pedagogy modeled in this class. Traditionally elementary mathematics has had a preoccupation with computation and other traditional skills. The vision of this course is to initiate the following instructional reforms.

## **COURSE DELIVERY AND LAYOUT:**

This course is delivered through a combination of face-to-face class sessions and Online Canvas. You are expected to log into Canvas frequently. It is organized into eight modules that include in-class activities, mathematical exercises and problems (completed out-of-class but discussed in following class sessions), on-line quizzes, in class exams, and on-line discussion prompts. All these assessments will be in the calendar:

- Module mathematical exercises and problems - check of written work and preparation to participate in class discussions.
- Module on-line quizzes - unlimited attempts on quizzes, use quizzes to prepare for module written exams.
- Module written exams - 30 minute exams aligned with the exercises and on-line quizzes, students may re-take similar problems that they miss to earn back half of the missed points.
- Module discussion writing - students will explain how module activities reveal the connection between a main concept and multiple procedures studied in the module.
- Final exam during finals week.

**Required text:** No text, keep packets in a three-ring notebook.

## **Software and Hardware Required**

- Access to CWU Canvas. Documents in this course will be presented in .pdf. You will need Adobe Reader which you can obtain for free at <http://get.adobe.com/reader/>. Review the complete [Technology Requirements \(Links to an external site.\)](#)Links to an external site. for CWU online students.

Here is the abbreviated version:

- Internet connection
- Mac OS x 10.9 and higher or
- Windows Vista or higher--Windows 7 is recommended
- Up-to-date version of Firefox or Chrome
- [Run the browser check \(Links to an external site.\)](#)Links to an external site. to check your system settings.

**COURSE OBJECTIVES:**

By the end of the course, teacher candidates will be able to:

Outcomes	Assessment	Standards
Students will use and explain geometric concepts of point, line (both parallel, perpendicular and skew), plane, and angle and use them in describing and defining shapes and reasoning about spatial locations.	Exercises, Quizzes, Tests, and Writing	1.D.8
Students will explain and prove the Pythagorean Theorem and apply it to problem solving situation.	Exercises, Quizzes, Tests, and Writing	1.D.8.E
Students will use and explain congruence and similarity in terms of translations, rotations, reflections and dilations and solve problems involving congruence and similarity in multiple ways.	Exercises, Quizzes, Tests, and Writing	1.D.8
Students will be able to derive formulas for the perimeter and area of two dimensional figures and the volume and surface area of three dimensional figures. They will then apply the formulas to solving problems involving two and three dimensional shapes.	Exercises, Quizzes, Tests, and Writing	1.D.7, 1.D.8
Students will use appropriate technology to investigate and represent concepts, methods and application of mathematical concepts	Exercises, Quizzes, Tests, and Writing	1.D.11
Students will use principles of mathematical thinking and problem solving to explore, solve, generalize and prove mathematical problems.	Exercises, Quizzes, Tests, and Writing	1.D.2
Using the Van Hiele levels of geometric understanding, students will explain the developmental progression of geometric thinking including the development of spatial perception, recognition of shapes, visual matching, counting, classifying and creation of two- and three-dimensional objects, creating and expanding patterns, and spatial rotation.	Exercises, Quizzes, Tests, and Writing	1.D.1
Students will engage in developmentally and culturally responsive teaching of geometric concepts .	Exercises, Quizzes, Tests, and Writing	1.D.12.E
Select, use, and determine suitability of the available mathematics curricula, teaching materials, and other resources including manipulatives for the teaching/learning of geometry for all students.	Exercises, Quizzes, Tests, and Writing	1.D.12.A
Demonstrate the ability to guide student discourse with geometric concepts.	Exercises, Quizzes, Tests, and Writing	1.D.12.C

**ASSIGNMENTS AND EVALUATION GUIDELINES:**

The instructional and assessment strategies for this course are designed to enable your achievement of the course performance outcomes. The instructors will give you feedback to support progress in meeting performance outcomes.

Assignment	Points
Exercises for each Module	135
Practice quizzes for each Module	225
Written Quizzes for each Module	450
Written Discussion for each Module	180
Final	100
<b>Total Points</b>	<b>1,090</b>

**Grading Scale**

93-100% = A, 90-93% = A-, 87-90% = B+, 83-87% = B, 80-83% = B-, 77-80% = C+, 73-77% = C, 70-73% = C-, 67-70% = D+, 63-67% = D, 60-63% = D-, 0-60% = F Please see the CWU Catalog for the eligibility for an incomplete (I).

**Performance Expectations**

All of the assignments and directions can be found on Canvas. If a course deadline was missed, assessment alternatives are left up to the discretion of the instructors.

**COURSE POLICIES:****Instructor Feedback/Communication**

The instructor will read and reply to all e-mails promptly. You will receive specific feedback in the form of electronic comments appended to your electronic submission. I will use the Announcements tool in CANVAS to communicate changes to the course and other course information.

**Suggestions for Success**

Take the responsibility for your own achievement of these performance objectives. You can get individual help by e-mail or in person in my office. If at any time you have trouble-using Blackboard or do not understand an assignment make sure to contact the instructor. Use the activities, assignments, assessments and people such as the instructor to insure that you understand the mathematical teaching concepts and can demonstrated this understanding in the form of the performance objectives.

**Student Feedback/Communication**

I welcome all feedback on the course. My preferred method of communication with individual students is via email. I am also available for office hours . If you experience a legitimate emergency (according to my standards) that will prevent you from completing required coursework on time, I expect you to communicate with me at the earliest reasonable opportunity. Please state the nature of the emergency, and when you expect to turn in the coursework.

**Submitting Electronic Files**

All electronic files must be submitted in .doc or .pdf format. If you do not have Microsoft Word, you can download Open Office Writer for free at <http://www.openoffice.org/>. This will allow you to open the instruction files, make changes and save in .doc or .pdf.

**Late and Uncompleted Work**

- If extenuating circumstances exist, contact instructor.
- All course assignments must be completed to pass the course.

**UNIVERSITY POLICIES:****AMERICANS WITH DISABILITIES ACT (ADA).**

Students with disabilities who require academic adjustments in this class should have documentation of their "Confirmation of Eligibility for Academic Adjustments" from the Disability Support Services Office. Students with disabilities without this form should contact the Disability Support Services Office, Bouillon 205 or [dssreceipt@cwu.edu](mailto:dssreceipt@cwu.edu) or 963-2171 immediately. This should be provided to the instructor as soon as possible so we can meet to discuss how the approved adjustments will be implemented in this class.

**ACADEMIC HONESTY**

Academic dishonesty is defined in the CWU Student Conduct Code (11.B). If academic dishonesty is confirmed, the instructor may issue a failing grade for the specific assignment and/or for the course. Withdrawing from a course does not excuse academic dishonesty. In circumstances when academic dishonesty is confirmed, a W can be replaced by a letter grade.

Collaboration is encouraged for developing your knowledge and skill, BUT

- The final product must be your original work. Your thoughts are considered original if you connect your interpretation of the reading with your personal experience and values, and you openly acknowledge where you got information.
- Sometimes it is inappropriate to consult others at all. For instance, the two written examinations are structured as take-home exercises requiring a professional integrity to work independently.

**ACADEMIC MATURITY**

In this class we emphasize a disposition toward working independently because teachers function autonomously without the frequent feedback students enjoy. In this course, you are expected to read the written word carefully for

its intended meaning and purpose. Unfortunately, many students are accustomed to a much more passive role. Worse, some students cannot make a decision without the personal attention of the instructor. Strategies for being independent will be shared in this class and your sincere effort to develop independence will be readily observed. If you have difficulty reading, you must take the initiative to seek help but in a timely manner, that is, well in advance of any target dates.

**Calendar**

The calendar with all dates class will meet, major due dates for assessments can be found in CANVAS.