

Mathematics for Teachers: Geometry & Measurement - Math 226 (4 credits) – Fall 2021

Instructor: Dr. Brent Hancock

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Class times: N/A (online and asynchronous)

Office hours: Tuesdays 2:00-2:50pm and Wednesdays 3:00-3:50pm via Canvas (on Blackboard Ultra), or by appointment (please email me to set up an appointment).

Required Materials:

- Required Text: *Mathematics for Elementary Teachers* by Sybilla Beckmann (5th edition, with Activities)*.

***IMPORTANT:** You will automatically be enrolled in a CWU Inclusive Access version of this text online, unless you opt out by **September 29**. If you choose to opt out of Inclusive Access, you will need to have a copy of the text with an unused MyLab and Mastering online access code.

IMPORTANT: A physical copy of the Beckmann text from MATH 164 will not suffice, as it does not contain the MyLab and Mastering access code for the online homework. Your student account will automatically be billed for the Inclusive Access edition of the e-text unless you opt out by September 29. Please email me immediately if you have any questions about the above.

- Scientific calculator, compass, protractor, ruler, scissors, tape. You might also want to keep course materials organized in a 3-ring notebook.
- Access to Canvas online at <http://canvas.cwu.edu> – this is where I will post everything for the course: course handouts, grades, policies, announcements etc. so it is important that you log on daily Monday-Thursday.

Email Correspondence: I will respond to student communications during business hours (M-F, 8am-5pm). You can typically expect a reply within approximately 24 hours, not including weekends. If you email me with questions about specific homework problems, I can be most helpful if you send pictures of what you've tried so far or provide a brief explanation of what you've tried so far.

Course Description: This course is designed for students who plan to teach at the elementary or middle grades level and who have declared education as their major course of study. This course focuses on an intuitive development of geometric ideas including point set Euclidean geometry, measurement, area, perimeter, volume, and transformational geometry. Concepts are taught from a problem-solving perspective using appropriate technology and hands-on manipulatives (or virtual versions of those manipulatives).

Course Rationale: In order to become successful educators, prospective elementary and middle school teachers must develop (among other attributes) a deep understanding of the content they will teach. According to the NCTM *Principles and Standards for School Mathematics* (2000), Geometry represents an essential strand of K-12 mathematical content, in that "Geometry has

long been regarded as the place in the school mathematics curriculum where students learn to reason and see the axiomatic structure of mathematics” (p. 41). Geometry is also an ideal venue for developing and practicing spatial reasoning and visualization. In this spirit, the activities and assessments in this course are implemented to align with the various geometry and measurement content standards set forth by the NCTM. A specific list of course learning objectives is provided on a later page of this syllabus. Moreover, classroom activities will be facilitated in accordance with the following eight standards for mathematical practice advocated for by the Common Core:

- ✓ (MP1) Make sense of problems and persevere in solving them.
- ✓ (MP2) Reason abstractly and quantitatively.
- ✓ (MP3) Construct viable arguments and critique the reasoning of others.
- ✓ (MP4) Model with mathematics.
- ✓ (MP5) Use appropriate tools strategically.
- ✓ (MP6) Attend to precision.
- ✓ (MP7) Look for and make use of structure.
- ✓ (MP8) Look for and express regularity in repeated reasoning.

Course Modules on Canvas: The course will be divided into “modules” and organized this way on Canvas. All course handouts, assignments, etc. will be posted in their corresponding module as the course progresses.

Final Exam: All students must take the final exam at the scheduled date and time. More information about the date and time of the exam will be announced at a later time.

Important policies:

- No late work is accepted without *prior arrangements* made with me due to extenuating circumstances.
- Consult university policies ([CWUP 5-90-040\(22\)](#), [CWUR 2-90-040\(22\)](#), and [WAC 106-125-020](#)) for student conduct, cheating, plagiarism, and other academic expectations. CWU's policies and recommendations for academic misconduct will be followed, leading to disciplinary action up to and including failing the course.

COURSE ASSESSMENT DETAILS

Homework/Reading Questions/Activities:

The course is organized according to multiple *units/modules*, each corresponding to a major geometric topic. Each unit contains multiple “in-class” activities as well as homework assignments to be completed after we finish certain activities. Homework assignments will be completed online via the Pearson MyLab and Mastering program linked to your e-text. This is why you must have a current/valid MyLab and Mastering access code (regardless of whether you opt out of the Inclusive Access textbook). More information about registering for the course via Canvas will be posted on Canvas.

Students are expected to read all corresponding section(s) from the textbook as announced on Canvas. I will periodically assign reading questions to help emphasize important topics from the reading. Reading questions will be graded for completion; you will not receive detailed feedback on these (unlike quizzes/exams) but I will just be checking that you answered all questions fully.

****IMPORTANT****: You will NOT be required to meet at synchronous times with the whole class. You will only be graded on the assessments listed in the table below. That said, I will be available for (optional) virtual office hours during the listed times if you have questions along the way.

Quizzes:

We will have several (likely 3) planned quizzes which will serve as an opportunity to practice geometry skills from the recent unit(s) in a timed but low-stakes “testing” environment. Each quiz date will be posted at least 1 week in advance of the quiz on Canvas.

Tests and Final Exam:

We will have two scheduled tests in this class, each corresponding to material from multiple units in the course. Exam dates will be provided on Canvas well in advance of the test. We will also have a cumulative final exam covering all the material from this course.

COURSE GRADE CALCULATION

Weight	Assessment category (grading scale)
20%	Homework
15%	Quizzes (3)
40%	Tests (2)
20%	Final Exam
5%	Reading Questions

Letter grades will be assigned as follows:

A- 90.0 - 92.9%	A 93.0 - 100%	
B- 80.0 - 82.9%	B 83.0 - 86.9%	B+ 87.0-89.9 %
C- 70.0 - 72.9%	C 73.0 – 76.9%	C+ 77.0 - 79.9%
D 60.0 - 69.9%		
F 0 - 59.9%		

Key skills and learning objectives:

- Express mathematical arguments in multiple representations, including symbolically, diagrammatically, and verbally.
- Formulate and test geometric conjectures, implementing physical manipulatives and/or digital technology when appropriate.
- Write basic proofs to justify geometric claims.
- Find the perimeter, area, and volume of various geometric figures.
- Use standard and non-standard units of measure to solve problems.
- Convert from one unit to another in standard and metric measurement systems.
- Name and discuss properties of two- and three-dimensional figures.
- Demonstrate a knowledge of the relationship between parallel lines and angle measure.
- Demonstrate a knowledge of the properties of triangles and special cases of triangles.
- Demonstrate understanding of the sum of interior, central and exterior angles of polygons.
- Explain and use the properties of quadrilaterals.
- Identify and create basic geometric transformations.
- Identify and explain different types of symmetries.

Disability Support Services:

Central Washington University is committed to creating a learning environment that meets the needs of its diverse student body. Students with disabilities should contact Disability Services to discuss a range of options to removing barriers, including accommodations. Disability Support Services in Hogue 126. They may also be reached via email at (DS@cwu.edu).

Respect, inclusivity, and diversity:

In my classroom, diversity and individual differences are respected, appreciated, and recognized as a source of strength. Students in this class are encouraged and expected to speak up and participate during class meetings, **and** to carefully and respectfully listen to each other. So that everyone feels comfortable participating, every member of this class **must** show respect for every other member of this class. Be good to each other.

Changes to the syllabus: I reserve the right to make modifications to this syllabus at any time. In the event of such changes, I will notify the class and upload a revised syllabus on Canvas.