

Mathematics for Teachers: Geometry & Measurement - Math 226 (4 credits) – Winter 2020

Instructor: Dr. Brent Hancock

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Class times: Class TWRf 10:00-10:50am, Samuelson 116 (Math Ed Lab 2)

Office hours: TWRf 12:00-12:50 pm, or by appointment (send me an email to set up a time)

Required Materials:

- Required Text: *Mathematics for Elementary Teachers* by Sybilla Beckmann (5th edition, with Activities)
- Scientific calculator, compass, protractor, and ruler. You will need 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 course handouts, grades, policies, announcements etc. so it is important that you log on regularly).

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.

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 interactions 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: Friday March 20 from 8:00-10:00 am. **All students must take the final exam at the scheduled date and time. Make travel plans accordingly.**

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.
- **Cell phone policy:** I will not allow cell phones or similar devices to be used during exams. This includes using your phone as a calculator. During exams, please keep all phones out of sight and silent. If I see anyone using a cell phone during an exam, I may assign that student a zero on that exam. On non-exam days, please be respectful of your classmates and instructor by leaving your phone in your bag and on silent. If you anticipate an important phone call, please let me know and step outside in the hall to take the call.

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. On days when homework assignments are collected, homework must be stapled and submitted at the beginning of class. Additionally, students are expected to read the corresponding section(s) from the textbook; I will periodically assign reading questions to help emphasize important points from the reading. Generally, any class activities that are not finished during class must be completed at home, unless stated otherwise by the instructor on the day the activity is conducted. Students may be required to submit certain activities to be graded; in such instances, students will be notified in advance.

Attendance and Participation:

Due to the collaborative nature of the activities in this course, attendance and active participation are crucial to students' success in the course. This component of the grade will be calculated based on students' attendance, significant involvement in small-group and full-class discussions, and meaningful participation in group presentations. Students are encouraged to find multiple solution approaches to problems, ask each other clarifying questions, and challenge each other to fully justify their mathematical arguments. Students are expected to keep computers and phones put away so as not to create a distracting environment for others. Students are expected to arrive to class on time and to not leave class early unless given permission by the instructor. The more you participate, the more you will get from this course, and the more fun you will have!

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. Quizzes

will take place at the beginning of class on the designated days, unless stated otherwise by the instructor.

Tests and Final Exam:

We will have two scheduled tests in this class, each corresponding to material from multiple units in the course. Tentative exam dates will be provided on Canvas and announced in class. We will also have a cumulative final exam covering all the material from this course. You should bring your own scientific calculator to each exam, and please note that *you will not be allowed to use your cell phone as a calculator* during exams or quizzes.

****Important Note about Excused Absences**

Please note that there will be no makeup exams or quizzes. Exceptions will only be granted if you miss an exam due to a *verifiable and documented* medical emergency or other university-authorized absence (eg. official CWU sports team obligation, participation in religious observance etc.) and have given me *appropriate advance notice*. Please consult the University student handbook for details on what is considered to be a University-authorized absence, and provide me with a written request ASAP (i.e. before the drop deadline) if you think you will have a conflict with any test dates. In compliance with RCW 28B.137.010, Central Washington University makes every effort to deal reasonably and fairly with students who, because of religious obligations, have conflicts with scheduled exams, assignments or required attendance. Students must present written notice to their instructor within the first two weeks of class listing the specific dates on which accommodations are required. Contact the Dean of Student Success at (509) 963-1515 for further information or questions.

COURSE GRADE CALCULATION

Weight	Assessment category (grading scale)
20%	Homework
15%	Quizzes
40%	Tests (2)
20%	Final Exam
5%	Attendance and Participation

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.