MATH 2120-02: Geometry & Measurement for Elementary School Teachers
Spring 2014, MWF 8:00-8:50am, Engineering Building Room 3106

Instructor: Keivan Hassani Monfared
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Prerequisites: Completion of MATH 1105 or its equivalent with a grade C or better Course Description: This course is a continuation of MATH 1105 and is for prospective elementary school teachers. Its primary emphasis is the development of spatial reasoning and asking and answering critical questions about spatial reasoning as evident in the real world. Explorations focus on the investigations of two- and three-dimensional shapes, including their properties, measurements, constructions, and transformations with the intent of preparing students to be competent in teaching these major concepts.

Required Text: Sowder, J., Sowder, L., & Nickerson, S. (2014). Reconceptualizing mathematics for elementary school teachers / 2nd edition. New York: W. H. Freeman & Company. Chapters 16-26.

Required Materials: Scientific calculator (preferably a graphing calculator such as a TI-73 or TI-82), 3 inch binder for class handouts, colored pencils or markers, ruler, and scissors.

Course Goals: Students will

- Use spatial visualization and geometric modeling to explore geometric shapes, structures, and their properties.
- Apply and use measurement concepts and tools.
- Know, understand, and apply the processes of mathematical problem solving.
- Reason, construct, and evaluate mathematical arguments and develop an appreciation for mathematical rigor and inquiry.
- Communicate their mathematical thinking orally and in writing to peers, faculty, and others.
- Recognize, use, and make connections between and among mathematical ideas and in contexts outside mathematics to build mathematical understanding.
- Use varied representations of mathematical ideas to support and deepen their mathematical understanding.
- Embrace technology as an essential tool for teaching and learning mathematics.
- Develop a positive disposition toward mathematical processes and mathematical learning.

Course Objectives: The specific learning outcomes include

- Analyze and describe basic shapes (two- and three-dimensional), their properties, and the relationships between them.
- Build and manipulate representations of two- and three-dimensional objects using concrete models, drawings, and dynamic geometry software.
- Specify locations and describe spatial relationships using coordinate geometry.
- Apply transformations and use symmetry, congruence, and similarity, including the role of proportional relationships in similarity.
- Understand the role of mathematical definition.
- Select and use appropriate measurement units, techniques, and tools, including standard (English and metric) systems as well as non-standard systems.
- Recognize and apply measurable attributes of objects and the units, systems, and processes of measurement.
- Employ estimation as a way of understanding measurement units and processes.
- Understand that measurements are approximate and that different units affect precision.
- Be able to compare units and convert measurements from one unit to another.
- Demonstrate knowledge of the historical development of Euclidean geometries and measurement systems including contributions from diverse cultures.

Graded Work: Save all assignments after they are graded and returned to you.

Professionalism and Participation: A high degree of professionalism, participation, and attendance in class is expected. Remember that you are responsible for your learning and conduct. Code of Conduct:

- Be on time to all classes and attend the entire class period.

- Focus on class and limit side activities or interruptions (e.g., side conversations, working on other things during class, sleeping, reading the newspaper, texting, etc.)
- Come prepared and with a positive and energetic attitude.
- Respect each person, treat each other with dignity, and encourage all to participate.

Course Assignments: (subject to change)

- 8% Homework and Formative Assessments
- 12% Quizzes
- 20% Writing Prompts
- 10% Group Project
- 35% Tests
- 15% Final Exam

Homework: Homework will be used to practice and refine your understanding of the material covered in class. It may also be used to prepare for upcoming material. Homework will be due at most once a week on Friday. Homework is the responsibility of each individual; however, you are highly encouraged to work in groups.

Formative Assessments: To provide me with information about how you are understanding the material and to plan for upcoming classes, I may ask you to complete formative assessments. These will be graded for completion.

Quizzes: Quizzes will be used to assess your understanding of the content covered in class similar to mini-tests. Quizzes will most often be take-home. Quizzes will be graded for quality with partial credit awarded as appropriate.

Writing Prompts: As future elementary teachers, one of your responsibilities will be to explain mathematical ideas to your students. Thus, you will be required to complete two writing prompts. Each student should prepare his/her own response to the writing prompt.

Group Project: You will be required to complete one project, which must be completed in a small group consisting of 3-4 members. It will be due on November 3. More information about the project will be forthcoming.

Tests and Final Comprehensive Exam: Test dates are tentatively scheduled for Monday Febuary 17, and Monday March 31. Tests and Final Comprehensive Exam: Test dates are tentatively scheduled for Friday May 9th, 8:00-10:00am, according to the final exam schedule. Note these dates and prepare your schedule (e.g., work schedule, flight reservations) in accordance; NO exceptions will be made. Evaluation of the examinations is based on point values of each test item, with partial credit awarded as appropriate. For most of the exam, open notes/textbook are **not** allowed.

Academic Honesty: The University of Wyoming is built upon a strong foundation of integrity, respect, and trust. All members of the university community have a responsibility to be honest and the right to expect honesty from others. Any form of academic dishonesty is unacceptable to our community and will not be tolerated. University Regulation 802, Revision 2, found at `http://uwadmnweb.uwyo.edu/legal/Uniregs/ur802.htm` defines academic dishonesty as "an act attempted or performed which misrepresents one's involvement in an academic task in any way, or permits another student to misrepresent the latter's involvement in an academic task by assisting the misrepresentation." There is a well-defined procedure to judge such cases, and serious penalties may be assessed. UWs policies and recommendations for academic misconduct will be followed in this course.

Math Lab: Help is available at the Math Lab (Ross Hall 29). Schedule: `http://math.uwyo.edu/Mathlab.asp`

Accommodations: If you have a physical, sensory, cognitive, or psychological disability and require accommodations, please let me know as soon as possible. You will need to register with, and provide documentation of your disability to, University Disability Support Services (UDSS) in SEO, room 330 Knight Hall, 766-6189, TTY: 766-3073.

Note: This syllabus and its contents may be subject to change. Any changes will be clearly announced in class.

Tentative Schedule:

Week	**Topics**
1	Ch. 16 Polygons
2	Ch. 17 Polyhedra
3,4	Ch. 18 Symmetry
5,6	Ch. 19 Tessellations
7,8	Ch. 20 Size changes and similarity
9,10	Ch. 22 Transformation geometry
11,12	Ch. 23 Measurement basics
13,14	Ch. 24 Area, surface area, and volume
15	Ch. 25 Counting units fast: Measurement formulas

It is almost a guarantee that this schedule will change as we move through the semester. Thus, please use it as a general guide, not a specific road map.