

# Casper College Course Syllabus

**Course:** Math 2120-01 Geometry and Measurement for Elementary School Teachers

**Semester:** Fall 2015

**Lecture Hours:** 3

**Lab Hours:** 0

**Credit Hours:** 3

**Class Time:** MTTH

**Room:** PS 107

**Instructor:** Mark Kuhlman

**Office:** PS 130

**Office Phone:** 268-2369

**Email:** mkuhlman@caspercollege.edu

**Office Hours:** MWTHF 9:00-9:50 am and T 1:00-1:50 pm

**If the above times don't work for you, please feel free to make an appointment - or just drop by!**

**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. 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.

**Prerequisites:** "C" or better in Math 1105.

**Co-requisite:** EDEL 2410 **MUST** be taken concurrently with MATH 2120

## **Outcomes:**

The Conference Board of the Mathematical Sciences recommended that "Prospective teachers need mathematics course that develop deep understanding of the mathematics they will teach. . . and most of all, [they] need to learn how to learn mathematics."

Consequently, the purpose of this course is to provide prospective elementary school teachers with a deeper understanding and mastery of the mathematical skills, concepts, processes, theories, and applications of algebra, probability, and statistics. This foundation will help future teachers to make appropriate "mathematical and pedagogical decisions" pertaining to the teaching of mathematics at the elementary level.

To meet the general learning outcomes for this course, students will

- Use spatial visualization and geometric modeling to explore and analyze 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:**

To meet the specific learning outcomes of this course, students will:

- 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.
- Understand the role of mathematical definition.
- Demonstrate knowledge of the historical development of Euclidean and non-Euclidean geometries including contributions from diverse cultures.
- 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 measurement and measurement systems including contributions from diverse cultures.

**Casper College may collect samples of student work demonstrating achievement of the above outcomes. Any personally identifying information will be removed from student work.**

### **Materials Needed:**

**Text:** *A Problem Solving Approach to Mathematics for Elementary School Teachers*, 11<sup>th</sup> ed., Billstein, Libeskind, and Lott

**Note:** This is the same book you used in Math 1105 (if you took it at CC last semester).

**Calculator:** A calculator is recommended but not required.

**Internet:** You will be required to have access to the Internet and Moodle. Some of our work might include Excel, Logo and Geogebra. You may access the Internet via the Casper College Computer Labs.

**Methodology:** Class time will be a mixture of lecture, discussion, and group activities. You will be expected to OWN everything taught in class (whether or not you are present). I recommend that you study with the intent to understand and not just to get by on the exam - think about how you will explain the concepts we are studying when you are "the teacher."

You will be strongly encouraged to participate in class. I hope you ask LOTS of questions. Besides contributing to lectures and class discussions, you may be asked to participate in group activities and complete several peer teaching assignments. Proficiency in mathematics requires practice! Consequently, homework will be assigned. The purpose of homework is NOT just to complete the assignment - it is to learn the material.

**Evaluation Criteria:** Your letter grade will be based on your performance (not effort) on the following tasks:

**Exams (approx 65%):** Four 100-point exams will be given and at the end of the semester a comprehensive final. You are required to take exams at the scheduled hours. Under some pre-approved circumstances an exam may be taken early. In the event that an exam is missed, the final exam percentage will count as the missed exam percentage. Missing a second exam will count as a 0%. All exams and quizzes are cumulative. Some of the exams may have an oral or demonstrative component.

**Assignments/Quiz/Projects/Exploration Problems (approx 35%):**

May consist of Moodle, Exploration Problems, calculator activities, peer teaching, expanded homework assignments, Online Geometry activities, article reviews or short papers.

**Absent/Late work Policy:** A high degree of professionalism, participation, and attendance in class is expected. College sponsored absences are cleared through the Office of Student Services. If you are absent for one week or more due to accident, illness, etc., contact the dean of students and explain your reason. In these cases arrangements will be made for you to make up your work.

**Grading Scale:** You are guaranteed a traditional grading scale of 90%+ A, 80-89% B, 70-79% C, 60-69% D, 59%- F. But I reserve the right to lower this without notice if I deem it necessary.

**Student Rights and Responsibilities:** Please refer to the Casper College Student Conduct and Judicial Code for information concerning your rights and responsibilities as a Casper College Student.

**Chain of Command:** If you have any problems with this class, you should first contact the instructor to attempt to solve the problem. If you are not satisfied with the solution offered by the instructor, you should then take the matter through the appropriate chain of command starting with the Department Head/Program Director, the Dean, and lastly the Vice President for Academic Affairs.

**Academic Dishonesty:** (Cheating & Plagiarism) Casper College demands intellectual honesty. Proven plagiarism or any form of dishonesty associated with the academic process can result in the offender failing the course in which the offense was committed or expulsion from school. See the Casper College Student Code of Conduct for more information on this topic.

**Official Means of Communication:** Casper College faculty and staff will employ the student's assigned Casper College email account as a primary method of communication. Students are responsible to check their account regularly. This is also, where you will find course evaluation links during course evaluation periods.

**ADA Accommodations Policy:** If you need academic accommodations because of a disability, please inform me as soon as possible. See me privately after class, or during my office hours. To request academic accommodations, students must first consult with the college's Disability Services Counselor located in the Gateway Building, Room 344, (307) 268-2557, [bheuer@caspercollege.edu](mailto:bheuer@caspercollege.edu). The Disability Services Counselor is responsible for reviewing documentation provided by students requesting accommodations, determining eligibility for accommodations, and helping students request and use appropriate accommodations.

**Last Day to Change to Audit or Withdraw:** November 12th, 2015 will be the last day to drop this class. If you are thinking about changing your class status, you must contact me BEFORE this date. You will not be allowed to audit unless you have been keeping up with your assignments.

**Help:** I recommend you keep up with the class. If you need help, I am more than happy to help you. I will be available to help individuals during my office hours or by appointment. **I want you to succeed!** The Math Lab (PS 104) is also a great place to go for assistance.

**IF YOU ARE HAVING TROUBLE IN THIS CLASS, PLEASE SEE  
ME AS SOON AS POSSIBLE!!!**

**Let's have a GREAT semester!**

**Math 2120**  
**Geometry and Measurement for Elementary School Teachers**

**TENTATIVE SCHEDULE FALL 2015**

Week	Topics
Week 1	Course Introduction Learning Geometry ... Van Hiele Model Introducing Geometric Activities
Week 2	11.1 and 11.2 Basic Notions and Linear Measure
Week 3	11.3 Curves, Polygons, and Symmetry
Week 4	11.3 Curves, Polygons, and Symmetry
Week 5	11.4 More about Angles (Exam #1)
Week 6	12.1 and 12.2 Congruence Through Constructions
Week 7	12.3 Additional Constructions
Week 8	12.4 Similar Triangles and Other Similar Figures
Week 9	12.6 Trig Ratios via Similarity (Exam #2)
Week 10	13.1 and 13.2 Translations, Rotations, and Reflections
Week 11	13.3 and 13.4 Dilations, Tessellations
Week 12	13.4 Tessellations (Exam #3)
Week 13	14.1 and 14.2 Areas, Pythagorean Theorem
Week 14	14.3 and 14.4 Geometry in 3D, Surface Areas
Week 15	14.5 Volume, Mass, and Temperature (Exam #4)
Week 16	Presentations and Wrap-Up, Review for Final Exam
Final Exam Week	Comprehensive Final Exam