Math 112 (10654) - Geometry in Elementary Mathematics - Fall 2013

Instructor: Barbara Nilson
Office: 2762
Phone: 760-355-6477
E-mail: bnilson@imperial.edu
Text: Reconceptualizing Mathematics for Elementary School Teachers, Sowder, Sowder, Nickerson 2nd ed
Last Day to Drop with W: Saturday, November 9, 2013
Final Exam: Wednesday, December 4, 2013

**Prerequisite: Math 90 or 91 (grade of C or better) or appropriate Placement Score.**

COURSE: Transferable math class, primarily for preparation for a teaching credential at the elementary level. Topics discussed are decimals and percents, geometry, geometric constructions, rotations, translations, measurements and problem solving. Chapters covered are Ch16 – Ch30.

MEASURABLE COURSE OBJECTIVES AND MINIMUM STANDARDS FOR GRADE OF "C":
Upon satisfactory completion of the course, students will be able to:
  1. Recognize two and three dimensional geometry, and solve a number of applications.
  2. Demonstrate the basic idea of congruence and similarity and actively develop a number of geometric constructions.
  3. Identify and apply different kinds of transformations, and various types of symmetry.
  4. Recognize a variety of geometric figures, and be able to use and apply formulae in both geometric and non-geometric context.
  5. Graph using the Cartesian system of coordinates and will recognize the relationship that exists between algebra and geometry.
  6. Solve word problems using the basic concepts of geometry and will identify various geometric patterns.
  7. Demonstrate a knowledge of statistics and probability.

STUDENT LEARNING OUTCOMES:
Upon course completion, the successful student will have acquired new skills, knowledge, and or attitudes as demonstrated by being able to:
  1. Geometric construction by hand and use of technology (ILO3, ILO4)
  2. Written mathematical communication skills (concepts such as transformation, symmetry, and definitions) (ILO1, ILO4)
  3. Transformation and tessellation projects (ILO3, ILO4)

GRADING POLICY
Your grade will be comprised of the following items and approximations:

Homework and 3 individual projects	400 points	~40%
10 quizzes	100 points	~10%
1 group project	100 points	~10%
2 exams (100 pts ea.) and final (200 points)	400 points	~40%
Total 1000 points	1000 points	~100%

Your final grade will be based on the following points and percentages:

90% to 100%	900-1000 points	A
80% to 89%	800-899 points	B
70% to 79%	700-799 points	C
60% to 69%	600-699 points	D
Below 60%	Below 600 points	F

EXAMS/PROJECTS/FINAL
Exam1 Ch 16-17
Projects for Ch 18-22.
Exam2 Ch 23-26
Group Project - Oral Ch 29-30
Final Exam – comprehensive, all material from the course

QUIZZES

There will 10 quizzes over the material covered in lecture, readings, and HW assignments. They are timed quizzes and there is no make-up if you missed the quiz.

MATERIALS: (Must be brought to every class.)
Calculator
Compass
Protractor
Straightedge
Scissors (opt)
Ziploc bag or other similar container for small items

HOMEWORK/PROJECTS

The HW and projects are approximately half of your grade, so be conscientious and diligent about turning these in. They should be clearly legible, labeled with the appropriate information (name, assignment number or title, date), and college quality. Minimum quality will result in minimum points.

IVC POLICIES

- Under IVC policy, students are expected to attend every session of class in which they are enrolled. If a student is unable to attend the course or must drop the course for any reason, it will be the responsibility of the student to withdraw from the course. I will not drop you from the course. If the student does not withdraw from the course and fails to complete the requirements of the course, the student will receive a failing grade. **The last day to withdraw from this course with a "W" is April 13, 2013.**
- Any student with a documented disability who may need educational accommodations should notify the instructor or the Disabled Student Programs and Services (DSP&S) office as soon as possible. The DSP&S office is located in Room 2117, in the Health Sciences Building. Their phone number is (760) 355-6312.
- Disruption of other students will result in a reprimand or expulsions from the class for that day. A second offense can result in administrative discipline.
- Cheating is not tolerated and will result in discipline from the administration.
- Bottled water is the only food or drink allowed in the room.

MY POLICIES

- Bring all materials to every class.
- Cell phones or other electronic communication devices can only be used for appropriate math purposes. They may not be used during an exam. Texting or using your cell phone for calls during class can be grounds for dismissal from class.
- Disruption in my class is defined as behavior that interferes with another student's ability to learn or is distracting to myself or others. Some examples are: talking with other students during lecture, ringing phones, texting, reading non-math materials such as magazines, watching and/or playing videos or games on an electronic device, cleaning out your backpack…
- Use only non-transmitting calculators during exams (i.e. no cell phones or other transmittal devices).
- Quality work is expected. If a student meets the stated requirements for an assignment, but does it in a minimal fashion, the maximum grade for the product will be points valued at "C". To earn points valued at "B" or "A" there must be reasonable quality in the work.
- Multiple infractions of my policies can result in a lowering of your grade by 1 letter.

PROJECTS

TRANSFORMATION - 60 Points (Ch 22)   **NOT 2 Squares**

Use Geometer's Sketchpad to create one geometric sketch with the following criteria:

- The sketch must include all of the following transformations: (10 pt ea)
  1) Translation
  2) Rotation
  3) Reflection
  4) Size transformation (Similarity)
- It must have at least 2 different polygons, such as triangles and quadrilaterals (5 pt)
- It must be one drawing, not several different sketches of each transformation (15 pt)
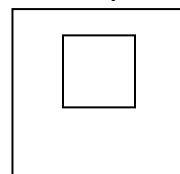
Caution: Each transformation must be separately defined. For example, a size transformation cannot be inside each other such as in these two squares that I placed inside the other. This is no longer two squares – it is one octagon and one square.

TESSELLATION – 35 Points (This will be demonstrated in class and is shown in Ch19.)
- Choose a polygon and transform it using rotation and/or translation – include a written description of your steps - 15pt.
- Make an **original*** curved tessellation using your transformed polygon with at least 3 rows and 4 figures in each row – 15pt.
- Include the actual polygon used to create the tessellation – you may tape or staple it to your project – 5pt.

The tessellation does not have to have a recognizable figure, but – **BONUS of 5 points** if it has a recognizable animal or caricature that would be appropriate for use in elementary school.
> **I have had problems with students going online and plagiarizing. If I am not sure how you developed your project, I might ask you to demonstrate or explain your work.*

COMPASS CONSTRUCTION – (Ch 20 shows the methods of construction.) 50 points
   1) Use a compass and straight edge as your only tools to create an accurate drawing of geometric shapes.
   2) Use Standard 8 ½ x 11 inch plain white paper. (**5pt** deduction for any other paper)
Graded on the following criteria:
   10pt - CONSTRUCTED – use the techniques of construction from textbook. Your construction must have appropriate skill level for a college project. The project should reflect skills in use of construction.
   20pt - CONGRUENT – All line, segments, curves, and areas that display symmetry must be congruent
   10pt - CLARITY – All lines should be as consistent in pressure as possible. All lines should be well defined in width, i.e. the pencil or writing tool should be very sharp. Extra or unnecessary lines should be erased and the paper in clean condition. Intersections should be clean and as exact as possible.
   5 pt – CLEAN – Paper should be clean, no creases or fold marks, no sign of erasures,
   5 pt - CENTERED – design centered on the page or appropriately placed for the construction design.

Ch29-30 STATISTICS GROUP PROJECT
You will not have an exam, rather a group project and oral presentation. Failure to participate in the process and the oral presentation will result in a reduced grade and/or failure of the project.
Group Project – 100 points
Survey of Typical IVC Students
1. Choose group members – 3 to 5 persons per group
2. Choose a topic for your survey – What do you want to know about IVC students? State your reasons for choosing this topic, your hypothesis (result you expect), and justification for your hypothesis.
3. Formulate a well stated question and determine your method of asking the question (anonymous slip of paper, face-to-face question, or …?)
4. Decide how to take a random sample of the IVC students (day/night; location on campus; male/female; age, etc.)
5. Survey enough students to have 100 usable data. Report reasons that some may have been thrown out of your results.
6. Make 2 visual models - graphs and /or chart to show your findings. They must be appropriately labeled and mathematically correct. They can be digital or physical. Explain your graphs – title, labels, numbers, results – as though your audience does not know how to read them.
7. Find mean, median, mode, and outliers on your data. Explain why some of these averages may not be possible. Explain which "average" you would use to report this survey. Find outliers (if appropriate) and explain the method you used to find outliers.
8. Present your findings to the class. Give a conclusive statement to your findings and if it supported your hypothesis. Explain what you would ask next if you could continue this survey. Discuss difficulties encountered during this project.
9. There is no report to turn in, but you will assess the other members of your team for purposes of participation.

Grading Criteria
 5pt – At least 100 pieces of data collected
 5pt – Participation – all persons in group participated in study **and** presentation
10pt – state hypothesis and rationale - #2 above

10pt – Question is well stated and method of collecting data is explained – #3
10pt – Random sampling is used and explained – #4
20pt – 2 Graphs (minimum) – the choice of graphs is appropriate, visibly understood, mathematically correct.
Compare them to each other and point out how the information is visually understood - #6
20pt – Averages stated and explained – #7
20pt – Conclusions: hypothesis valid (or not) and difficulties with the project. What went well, what did not go so well. Summarize the "typical IVC student."– #8

Schedule Ma112 Fall 2012 – B Nilson

(May be subject to change.)

Week	Week Begin	Lecture/ Readings	Quizzes/ Exams	Homework Due	Homework Assigned	Holidays
1	8/19/2013	16.1-16.3			16.1.1, 16.1.5, 16.1.11, 16.1.21, 16.2.6, 16.4.3	
2	8/26/2013	16.4-16.5, 17.1-17.2	Quiz1 Ch16	HW Ch16 due 30pt	17.1.1 – 4, 17.1.6, 17.2.1, 17.2.11	
3	9/2/2013	17.3-17.4	Quiz2 Ch17	HW Ch17.1 and 17.2 due – 35pt	17.3.4, 17.3.17, 17.4.3, 17.5.1, 17.5.8	*Labor Day, M 9/2*
4	9/9/2013	18.1-18.2, 21.1	Quiz3 Ch17	HW Ch17.3 – 5 due – 25pt		
5	9/16/2013	21.2	Exam Ch16-17	HW Ch18 due		
6	9/23/2013	22.1-22.4	Quiz4 Ch18			
7	9/30/2013	22.5, 20.1-20.2	Quiz5 Ch21			
8	10/7/2013	20.3, 19.1-19.2	Quiz6 Ch22			*Veteran's Day, M 10/11*
9	10/14/2013	23.1-23.2, 24.1-24.2	Quiz7 Ch19			
10	10/21/2013	25.1-25.3, 26.1	Quiz8 Ch23			
11	10/28/2013	26.2	Quiz9 Ch25			
12	11/4/2013	Ch29	Exam Ch23-26			
13	11/11/2013	Ch30				
14	11/18/2013	Ch30	Quiz10 Ch30			
15	11/25/2013	Group Project final review				*Thanksgiving, R 11/28*
16	12/2/2013	final review Final Exam				