Math 112 (10436) - Geometry in Elementary Mathematics – Fall 2012

Instructor: Barbara Nilson
Office: 2762
Phone: 760-355-6477
E-mail: bnilson@imperial.edu
Web Page: http://faculty.imperial.edu/barbara.nilson
Text: Reconceptualizing Mathematics for Elementary School Teachers, Sowder, 1st ed
Last Day to Drop with W: Saturday, November 10, 2012
Final Exam: Tuesday, December 4, 2012

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

COURSE: Transferable math class, primarily for preparation for a teaching credential at the elementary level. Areas covered are geometry, geometric construction, transformations, measurements, statistical data and probability. Chapters covered are Ch16 – Ch30.

STUDENT LEARNING OUTCOMES

By the end of this course students will be able to do:
1. Geometric construction using compass and straight edge, computer program
2. Written mathematical communication describing such concepts as: transformations, symmetry, definitions of geometric terms.
3. Transformation project using computer program such as Geometer's Sketchpad

COURSE COMPONENTS

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.

QUIZZES

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

EXAMS/FINAL

There will be two exams and a final during the semester. Test 1 will cover chapter 16-17. Projects will replace a test for Chapters 18-22. Test 2 will cover chapter 23-26. A group project will replace a test for Chapters 29-30. The final will cover all material from the course.

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

MATERIALS: calculator, compass, protractor, straightedge, scissors (opt.), Ziploc bag or other similar container for small items.

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 November 10, 2012.**

- 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
- Cell phones should be off during class. "Texting" is considered a disruption.
- Reading other materials or using a computer during class is considered disruption.
- No electronic devices can be used during an exam except a standard calculator. (i.e. no cell phones or other transmitting device may be used for calculation)
- 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.

TENTATIVE SCHEDULE of topics and exams for this course.

Week	Date	Description/Readings/Exams
1	8/20/2012	16.1, 16.2,.16.3
2	8/27/2012	16.4, 16.5, 17.1, 17.2
3	9/03/2012	17.3, 17.4, **Exam Ch 16 - 17**
4	9/10/2012	18.1, 18.2, 21.1
5	9/17/2012	21.2 construction, lab
6	9/24/2012	22.1, 22.2, 22.3, 22.4
7	10/01/2012	22.5, 20.1, 20.2
8	10/8/2012	20.3, 19.1, 19.2 **Projects**
9	10/15/2012	23.1, 23.2, 24.1, 24.2
10	10/22/2012	25.1, 25.2, 25.3, 26.1
11	10/29/2012	26.2 **Exam Ch 23-26**
12	11/5/2012	Ch 29
13	11/12/2012	Ch 30
14	11/19/2012	Ch 30
15	11/26/2012	**Oral Presentations,** review for final
16	12/3/2012	Final Exam

## Explanation of Projects

Transformation Project – 50 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
- 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 (5 pt)
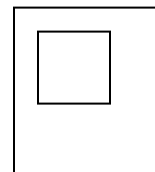
Caution: Each transformation must be separately defined. For example, a size transformation cannot be inside each other such as in these two squares that I placed inside the other. This is no longer two squares – it is one octagon and one square.

Tessellation Project – 25 Points (This will be demonstrated in class and Ch19.)
Make an **original*** curved tessellation (at least 3 rows with 4 figures in each row) from a polygon.
Include a copy of the original polygon.
Include the original transformed figure that you use for the tessellation.
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.

Hand Constructed Project – (Ch 20, Pg 473) 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:

   15 pt - 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.

   15 pt - CONGRUENT – All line, segments, curves, and areas that display symmetry must be congruent

   15 pt - 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 - CENTERED – design centered on the page or appropriately placed for the construction design.

Ch 29-30 Statistics 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 hypothesis (the result you expect) and reasons for your expectations.
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…)
5. Survey enough students to have 100 usable data. Report reasons that any were not used.
6. Make 2 visual models - graphs and /or chart to show your findings. They must be appropriately labeled and mathematically correct.
7. Find mean, median, mode, and outliers on your data. Explain why some of those may not be possible. Explain which "average" you would use to report this survey. Find outliers (if appropriate).
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) – choice of graphs is appropriate, visibly understood, and mathematically correct - #6

15pt – Averages stated and explained – #7

25pt – Conclusions and Problems – #8