THE UNIVERSITY OF TEXAS AT EL PASO
COLLEGE OF SCIENCE
DEPARTMENT OF MATHEMATICAL SCIENCES

Course #: MATH 3305 -13837
Course Title: Proportion and Algebra
Credit Hrs: 3
Term: Fall 2009
Course Meetings & Location: MW Lart 304 6:00-7:20
Prerequisite Courses: MATH 2303 with a grade of “C” or better
Course Fee: (if applicable) none
Instructor: Ms. J. Isaac
Office Location: Classroom Bldg 401
Contact Info: 276-3436cl jkisaac E-mail address

Office Hrs: MTuWTR before/after class, By Appt.
Suggested: N/A
Course Objectives (Learning Outcomes): Students will
(a) conceive mathematics as a problem solving endeavor that involves sense-making and thinking;
(b) develop the habit of attending to meaning, of analyzing problem situations, and of making conjectures and providing justifications;
(c) strengthen their quantitative reasoning and algebraic reasoning;
(d) deepen their understanding of fractions, ratios, proportions, change, graphs, functions, and algebra.

Course Activities/Assignments: A Portfolio is required, with sections for notes, homework, projects, tests with corrections, and misc. In addition, students will work in groups on group assignments.
Assessment of Course Objectives: There will be four exams, a portfolio grade, quizzes, class presentations (problems or project) and a final exam grade.
Course Schedule: Topics to be covered are listed below under Content Objectives
Tentative Monthly calendars will be distributed with assignments listed at the beginning of each month.
Final Exam:
Grading Policy:

A. **Exams:** There will be four exams and one comprehensive final exam/(Portfolio). All five exams will be weighted equally (15% each).

B. **Projects:** There will be a grade for group/take-home projects. There will be five projects throughout the semester and each project will be worth 5% of your grade.

C. **Participation.** Each student is expected to go to the board at least five times during the semester to do a homework problem or class problem. Anything more or less than 5 homework problems will result in 2 points each added or subtracted from your final grade for a maximum of 10 points.

Make-up Policy: There will be no retakes on exams, and no exam grade will be dropped, but if it is to the student’s advantage the final exam grade may replace one of the other four exam grades.

Attendance Policy: **Attendance:** You are expected to be in class. Since many of the activities we will be doing are in-class activities, you will learn a lot more if you are in class. Excessive absences may result in your being dropped from the course.

Academic Integrity Policy: Any student who commits an act of scholastic dishonesty is subject to discipline. Scholastic dishonesty includes, but is not limited to cheating, plagiarism, collusion, the submission for credit of any work or materials that are attributable in whole or in part to another person, taking an examination for another person, any act designed to give unfair advantage to a student or the attempt to commit such acts. Refer to the UTEP’s Policy at [http://academics.utep.edu/Default.aspx?tabid=23785](http://academics.utep.edu/Default.aspx?tabid=23785).

Civility Statement: Cell phones must be turned off in class. If you leave to answer the phone, keep going. In case of family illness or other emergency, let me know before class that you need to have your cell phone on. Only one person speaks at a time, unless working in groups, and always with respect.

Disability Statement: If a student has or suspects she/he has a disability and needs an accommodation, he/she should contact the Disabled Student Services Office (DSSO) at 747-5148 or at <dss@utep.edu> or go to Room 106 Union East Building. The student is responsible for presenting to the instructor any DSS accommodation letters and instructions.

Military Statement: If you are a military student with the potential of being called to military service and /or training during the course of the semester, you are encouraged to contact me as soon as possible.
Content Objectives

1. Quantitative Reasoning
   a. Undertake a quantitative analysis for a problem situation by identifying quantities and understanding how they are related.
   b. Discuss the incorrect ways that children solve story problems.
   c. Discuss the importance of appropriate drawings in problem situation.

2. Fractions and Operations involving Fractions
   b. Given a part of a whole and the fraction it represents, find the whole.
   c. Generate drawings to illustrate equivalent rational numbers (e.g., \( \frac{2}{5} = \frac{4}{10} = 0.4 = 40\%, \quad \frac{2}{4} = \frac{11}{4} \)).
   d. Be able to order a set of fractions, decimal numbers, and percents.
   e. Change terminating decimals and repeating decimals to fractions, and vice versa.
   f. Distinguish between rational numbers and irrational numbers.
   g. Understand the need for a common denominator for adding and subtracting fractions.
   h. Explain the meaning of fraction of a fraction and understand the referent unit for the multiplier, the multiplicand, and the product.
   i. Explain the meaning of dividing by a fraction (repeated-subtraction view) and understand the referent unit for the dividend, the divisor, and the quotient.
   j. Explain why the invert-and-multiply rule works.

3. Ratios and Proportions
   a. Differentiate between multiplicative reasoning and additive reasoning. Compare and contrast an additive comparison and a multiplicative comparison.
   b. Explain the difference between ratio as a multiplicative comparison and ratio as a measure.
   c. Perform a quantitative analysis to differentiate proportional situations from non-proportional situations. For a proportional situation, explain why the two ratios in a proportion are equal to one another.
   d. Solve proportional problems in ways other than cross-multiplying.
   e. Explain the definition of a proportion, of a unit ratio, and of a percent.
   f. Realize the importance of attending to the referent whole of a fraction and to the referent base of a percent.
   g. Make connections among percents, fractions, ratios, and decimals by distinguishing among different meanings of a rational number such as part-whole conception, sharing-equally division, multiplicative comparison, and value of a measure.

4. Algebra: Change, Graphs, Equations, and Functions
   a. Appreciate the power of algebra in modeling a phenomenon by identifying the relationship between two quantities.
   b. Use an algebraic equation, a graph, a table, or a verbal description to represent a relationship between two co-varying quantities.
c. Explain the connection among the “steepness” of a straight-line graph, the slope in an equation, and the rate of change in a given context.
d. Draw a qualitative graph for a situation, and conversely write a story for a qualitative graph.
e. Write or recognize an equation for a given situation or graph.
f. Explain and illustrate what is meant by the “graph as picture” misconception.
g. Solve a problem numerically, graphically, and algebraically.
h. Explain what a function is and why functions are important in mathematics.
i. Find a general function rule for a given pattern and give a justification that it is 100% reliable.

Chapters 1, 6, 7, 8, 9, 12, 13, 14.1, 14.2, and 15 in the *Reconceptualizing Mathematics* text will be covered. Understanding of Chapters 2-5 is a pre-requisite.