

SMTE 1350: Fundamentals of Math I Spring 2011

I. COURSE INFORMATION

Meeting time & place: TR 9:30-10:45 AM in CS 107

Instructor: Elaine Young

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Webpage: <http://sci.tamucc.edu/~eyoung/1350/index.html>

Office hours: Tuesdays & Thursdays 12-2 PM or by appointment

II. COURSE DESCRIPTION

This research-based course provides the conceptual framework for understanding and applying properties, models and operations of number systems. Related topics are studied in problem solving settings. Most students in this course have learned mathematics through a rule-based, abstract instructional program. This course is designed to emphasize in-depth basic understandings of number systems and arithmetic patterns, which are core ideas in the elementary mathematics curriculum. Communicating concepts, processes or solutions effectively, in oral and written forms, will be emphasized.

This course is intended for students seeking certification in elementary education, bilingual education, special education, and BSIS 4-8 programs. The course website may be found at <http://sci.tamucc.edu/~eyoung/1350/index.html>

III. PREREQUISITES for the COURSE

MATH 1314: College Algebra or equivalent, or placement beyond College Algebra

IV. TEXTS and OTHER SUPPLIES REQUIRED

- Scientific calculator
- *Principles and Standards for School Mathematics*, NCTM, 2000 (online)
- TEKS (<http://www.tea.state.tx.us/rules/tac/chapter111/index.html>)
- Access to document writing and spreadsheet software (Word and Excel suggested)
- Family Math Night presentation materials may cost up to \$5

V. STUDENT LEARNING OUTCOMES

The student will be able to do the following:

Sequences & mathematical reasoning

- Identify patterns, predict next term, find and apply formulas for arithmetic, geometric, Fibonacci, “see-and-say”, exponential (n^x), and power sequences (2^n)
- Model sequences concretely, symbolically and abstractly
- Develop and use iteration and recursion to model and solve problems
- Investigate interesting subsets of the natural numbers (evens, odds, powers of two, Fibonacci numbers, perfect squares)

Number systems

- Compare and contrast number systems (additive, subtractive, character, place value)
- Identify the structure and chart the relationships in the real number system
- Describe the roles of zero, face and place value in the base ten system
- Model whole numbers using Base 10 blocks
- Analyze, explain and model binary operations on whole numbers using Base 10 blocks
- Recognize and analyze standard and non-standard algorithms for binary operations on whole numbers
- Analyze error patterns of students working standard algorithms for binary operations on whole numbers
- Recognize and apply properties of real numbers

Prime & composite numbers

- Explain two or more reasons why one is not a prime number
- Develop full definitions of prime and composite numbers
- Identify prime numbers between 1-100 and how to find prime numbers greater than 100
- List all factors of a given number
- Determine the prime factorization of any given whole number
- Find GCF/LCM for a given set of whole numbers

Integers

- Model integers using 2-color chips
- Analyze, explain and model binary operations on integers using 2-color chips
- Explore historical/cultural scenarios using powers of two
- Explore powers of ten

Rational numbers

- Model fractions using Pattern blocks, Fraction bars and Fraction grids (area models)
- Model binary operations on fractions using Pattern blocks, Fraction bars and Fraction grids (area models)
- Explain and justify traditional algorithms for binary operations on fractions
- Create equivalent fractions using paper and manipulatives
- Explain why rational numbers are dense on the real numbers; give an example of a number set that is not dense and explain why not

- Put a set of fractions in order from smallest to greatest
- Find at least two fractions between a given pair of fractions

In the context of the above expectations, a student will --

Mathematical processes

- Make conjectures and use deductive methods to evaluate the validity of conjectures
- Recognize that a mathematical problem can be solved in a variety of ways, evaluate the appropriateness of various strategies, and select an appropriate strategy for a given problem
- Evaluate the reasonableness of a solution to a given problem
- Use physical and numerical models to represent a given problem or mathematical procedure
- Recognize that assumptions are made when solving problems and identify and evaluate those assumptions
- Explore problems using verbal, graphical, numerical, physical, and algebraic representations

Mathematical Perspectives

- Appreciate the contributions that different cultures have made to the field of mathematics and the impact mathematics has on society and culture
- Understand and apply how mathematics progresses from concrete to representation to abstract generalizations

Communication

- Communicate mathematical ideas and concepts in age-appropriate oral, written and visual forms for a class presentation
- Use mathematical processes to reason mathematically, solve mathematical problems, make mathematical connections within and outside of mathematics, and communicate mathematically
- Reflect on personal learning, change of attitude and beliefs, and growth in understanding through mathematical journaling
- Translate mathematical statements among developmentally appropriate language, standard English, mathematical language, and symbolic mathematics

Technology

- Use appropriate technology such as calculators, computer software, and the Internet to explore, research, solve, and compare mathematical situations and problems

Professional Development

- Be familiar with the National Council of Teachers of Mathematics and the Principles and Standards for School Mathematics, the NCTM website, and NCTM journals

VI. INSTRUCTIONAL METHODS and ACTIVITIES

The course will be a combination of lectures, individual, and group work, as well as professional development activities. Students are expected to participate in group and whole class discussions by contributing with knowledge and thoughtful evaluation of the contribution of others. Using physical models to teach the content topics, and understanding how learning occurs through their use, will be a substantial portion of the class instructional plan.

The professional development activity is an important avenue for applying what you learn in class to actual real life situations that will prepare you for teaching. This activity includes the opportunity of participating in Family Math Night or an alternative assignment of reading a book. Details are on the class webpage.

VII. EVALUATION and GRADE ASSIGNMENTS

Homework	25%	A	> 90%
Class presentation	25%	B	80% - 89%
Professional development activity	25%	C	70% - 79%
Final Exam	25%	D	60% - 69%
		F	< 60%

VIII. TENTATIVE COURSE SCHEDULE

The course calendar may be found online at <http://sci.tamucc.edu/~eyoung/1350/calendar.html>

Please note the **Family Math Night** will be scheduled on a weekday evening. This activity is outside of the normal class period but is required for the course. Please prepare for the activity date if you need transportation, child care, or excuses from other classes or work. If you cannot attend one of these activities, there is an alternate assignment (see course webpage).

The **final exam** will be given on Thursday, 5 May, from 8:00–10:30 AM in the classroom.

IX. CLASS POLICIES

Homework: this category includes homework, in-class assignments, mathematics journals, and quizzes. Email journal assignments are due before the next class period starts. Please use standard document software and attach your journal to your email message. It is your responsibility to ensure that I receive and can open/read all attached assignments. I will always acknowledge receipt of email messages.

Fraction mastery quiz: you must pass this quiz with a 75% score to pass this course. You may not use a calculator on this quiz, but please do use your brain!

Class presentations: your group will present a number system project to the class. Details are on the course website. **Attendance is required for all class presentation days**; any absence will affect your own presentation grade. If you must be absent on a presentation day, contact the instructor for optional alternative assignments.

Final exam: the final exam will be cumulative. A review sheet can be found on the course website.

Absences & make-up work: for any absence with a documented excuse, students may make up the work and turn it in late the next class period. Please notify the instructor (and your table group) before class if you are going to be absent.

Late homework: late homework will be accepted at the discretion of the instructor, with a 10% penalty for every weekday it is late. The final date for late work to be submitted is Friday, 28 April 2011.

X. REFERENCES

Bransford, J.D., Brown, A.L., & Cocking, R.R. (Eds.). (2000). How People Learn: Brain, Mind, Experience, and School. Washington, DC: National Academies Press.

National Council of Teachers of Mathematics. (2000). Principles and Standards for School Mathematics. Reston, VA: Author.

SBEC Technology Standards for Beginning Teachers. [Online]
http://www.sbec.state.tx.us/SBECOnline/standtest/standards/techapps_allbegtch.pdf

Texas Education Agency. (2007). Texas Essential Knowledge and Skills. [Online]
<http://www.tea.state.tx.us/teks/>

Van de Walle, J. (2007). Elementary and Middle School Mathematics (6th edition). Upper Saddle River, NJ: Pearson Allyn & Bacon.

Academic Integrity/Plagiarism

University students are expected to conduct themselves in accordance with the highest standards of academic honesty. Academic misconduct for which a student is subject to penalty includes all forms of cheating, such as illicit possession of examinations or examination materials, falsification, forgery, complicity or plagiarism. (Plagiarism is the presentation of the work of another as one's own work.) In this class, academic misconduct or complicity in an act of academic misconduct on an assignment or test will result in a zero grade.

Dropping a Class

I hope that you never find it necessary to drop this or any other class. However, events can sometimes occur that make dropping a course necessary or wise.

Please consult with me before you decide to drop to be sure it is the best thing to do. Should dropping the course be the best course of action, you must initiate the process to drop the course by going to the Student Services Center and filling out a course drop form. Just stopping attendance and participation WILL NOT automatically result in your being dropped from the class. **Friday, 5 April 2011**, is the last day to drop a class with an automatic grade of “W” this term.

Classroom/professional behavior

Texas A&M University-Corpus Christi, as an academic community, requires that each individual respect the needs of others to study and learn in a peaceful atmosphere. Under Article III of the Student Code of Conduct, classroom behavior that interferes with either (a) the instructor’s ability to conduct the class or (b) the ability of other students to profit from the instructional program may be considered a breach of the peace and is subject to disciplinary sanction outlined in article VII of the Student Code of Conduct. Students engaging in unacceptable behavior may be instructed to leave the classroom. This prohibition applies to all instructional forums, including classrooms, electronic classrooms, labs, discussion groups, field trips, etc.

Grade Appeals

As stated in University Rule 13.02.99.C2, Student Grade Appeals, a student who believes that he or she has not been held to appropriate academic standards as outlined in the class syllabus, equitable evaluation procedures, or appropriate grading, may appeal the final grade given in the course. The burden of proof is upon the student to demonstrate the appropriateness of the appeal. A student with a complaint about a grade is encouraged to first discuss the matter with the instructor. For complete details, including the responsibilities of the parties involved in the process and the number of days allowed for completing the steps in the process, see University Rule 13.02.99.C2, Student Grade Appeals, and University Procedure 13.02.99.C2.01, Student Grade Appeal Procedures. These documents are accessible through the University Rules Web site at http://www.tamucc.edu/provost/university_rules/index.html. For assistance and/or guidance in the grade appeal process, students may contact the Office of Student Affairs.

Disabilities Accommodations

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please call or visit Disability Services at (361) 825-5816 in Driftwood 101.

Veterans

If you are a returning veteran and are experiencing cognitive and/or physical access issues in the classroom or on campus, please contact the Disability Services office for assistance at (361) 825-5816.