

MTH 127, Introduction to Mathematics for Elementary Teachers

Department of Mathematics and Statistics

Semester

Professor: Dr. Arbitrary Sample
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Office Hours:

Class Times & Place: 11-11:50 MWF, Room 024, Math Building

Monday	Tuesday	Wednesday	Thursday	Friday
9-10, 1:30-3	None	9-10, 1:30-3	9-11, 2-3	9-10

Course description: Elementary concepts of sets, numeration systems, number theory, and properties of the natural numbers, integers, rational, and real number systems with an emphasis on problem solving and critical thinking.

CURRENT Text and Materials: The required textbook is Thomas Son nabend. *Mathematics for Teachers: An Interactive Approach for Grades K-8*, fourth edition. Brooks/Cole, Belmont CA, 2010. ISBN-13: 978-0-495-56166-8, ISBN-10: 0-495-56166-5. Topics covered this semester are included in chapters 1 through 7 of the textbook. For exams, students may a calculator.

Core Objectives (CO):

1. **Critical Thinking** [CO 1]: to include creative thinking, innovation, inquiry, and analysis, evaluation and synthesis of information
2. **Communication Skills** [CO 2]: to include effective development, interpretation and expression of ideas through written, oral and visual communication
3. **Empirical and Quantitative Skills** [CO 3]: to include the manipulation and analysis of numerical data or observable facts resulting in informed conclusions

SAMPLE Exam Calendar: Please note that the dates for our in-class exams below are **subject to change**. The final is university scheduled and cannot be taken at a different time without permission of the Dean of the College of Sciences and Mathematics.

Exam 1 [CO 1, 2, 3] Thursday, February 7
 Exam 2 [CO 1, 2, 3] Thursday, March 7
 Exam 3 [CO 1, 2, 3] Thursday, April 11
 Final [CO 1, 2, 3] Monday, May 6, 10:30 a.m.—12:30 p.m. in our regular classroom

SAMPLE Course Requirements/Assignments:

- **Three in-class exams**—If a student must miss an exam due to an excused absence, special arrangements should be made in advance. Student ID with photo may be required for exams. **No cell phone will be allowed on exams.** You will need to bring your own calculator to exams. The first three exams consist of problems similar to those practiced in class and homework for which students must think critically [CO 1] to make a plan for solving the problem and incorporate empirical or quantitative reasoning [CO 3] as appropriate to communicate [CO 2] a logically ordered solution with complete and correct notation.
- **Homework**—Homework assignments will be collected at the beginning of most class periods. Homework assignments consist of problems from each major topic in the course calendar/outline similar to those practiced in class for which students must think critically [CO1] to make a plan for solving the problem, and incorporate empirical or quantitative reasoning [CO 3] as appropriate to communicate [CO 2] a logically ordered solution with complete and correct notation.
- **Arithmetic Exam**—Students will be asked to take an exam on elementary school arithmetic during the second week of class. Topics on the exam will include addition, subtraction, multiplication, and division of whole numbers, fractions, and decimal numbers. Calculators will not be allowed on this exam. A passing grade on the exam will be 90%. Students who do not pass the exam will be given multiple opportunities to retake the exam. Failure to pass the arithmetic exam by the last day to drop courses (Wednesday, October 24, 20xx) will result in your course grade being lowered by one letter grade. That is, an A would become a B, a B would become a C, etc.
- **A comprehensive final exam**—The final exam is Monday, May 6, 10:30 a.m.-12:30 p.m. The comprehensive final exam consists of problems similar to those practiced in class and homework for which students must think critically [CO 1] to make a plan for solving the problem, and incorporate empirical or quantitative reasoning [CO 3] as appropriate to communicate [CO 2] a logically ordered solution with complete and correct notation.
- **Resurrection Policy**— If you score better on the final exam than your lowest midterm exam, we will replace your midterm grade with your final exam grade. The resurrection policy does not apply to your homework grade or to the arithmetic exam.
- **Class attendance and participation**—Students are expected to attend all class meetings, arriving on time. If you are absent, you are responsible for determining what you missed and for being prepared for class when you return. Leaving class early without notifying the professor in advance will result in your being counted absent for the class session. Students that sleep in class, send or receive text messages, or conduct other online activities not directly related to class will be counted absent.

- *Preparing for class*—Students should be prepared to invest several hours per day outside of class reading the text, practicing examples, and working homework exercises. *Material to be discussed in class should be read before coming to class.* Check your university email regularly, as I may send reminders, assignments, or announcements

Grading Policy: 60% First Three Exams (20% each)
20% Homework
20% Comprehensive Final Exam

Grading Scale: 90% - 100%: A
80% - 90%: B
70% - 80%: C
60% - 70%: D
Below 60%: F

Department syllabus: Please read the official Department of Mathematics & Statistics syllabus for MTH 127 at <http://www.sfasu.edu/math/courses/syllabi/MTH127Syllabus.pdf>.

Course outline:	Approximate time spent
<ul style="list-style-type: none"> • Techniques of problem solving and estimation skills <i>The following topics will be threaded throughout the course in order to develop the habits of mind necessary in mathematics:</i> <ul style="list-style-type: none"> ○ Introduce Polya's Problem Solving Process: Understand the Problem, Devise a Plan, Carry Out Plan, Look Back ○ Explore Basic Problem Solving Strategies ○ Explore Patterns in Language, Figures, Numbers, Sequences and Geometry ○ Develop Estimation Skills with Mental Arithmetic 	10%
<ul style="list-style-type: none"> • Sets and Logic: An Introduction <ul style="list-style-type: none"> ○ Classify and Sort Objects According to Attributes ○ Introduce the Language of Logic Connectives: And, Or, Not, Implies ○ Use Venn Diagrams as Problem-Solving Tools ○ Introduce Set Terminology and Notation ○ Explore Set Relations, Operations, and Properties ○ Introduce Functions as Sets 	15%
<ul style="list-style-type: none"> • Whole Numbers and Numeration: Concepts and Algorithms <ul style="list-style-type: none"> ○ Define the Set of Whole Numbers ○ Model Whole Number Operations using a Variety of Methods ○ Verify Properties of Operations: Binary Operation; Closed, Commutative, Associative, Distributive -Multiplication over Addition, Identities, Multiplication by Zero; Division Algorithm ○ Explore Place Value Systems using Base Five Arithmetic ○ Develop and Apply Algorithms for Whole Number Operations ○ Develop Definition and Properties for Whole Number Exponents 	20%
<ul style="list-style-type: none"> • Number Theory: An Introduction <ul style="list-style-type: none"> ○ Define and Explore Primes and Composites ○ Explore Basic Divisibility Properties of Sums and Products ○ Explore Applications of the Fundamental Theorem of Arithmetic ○ Define the GCD and LCM and Use Algorithms for Finding Each ○ Explore Applications of the GCD and LCM 	10%
<ul style="list-style-type: none"> • Integers: Concepts and Algorithms <ul style="list-style-type: none"> ○ Model Integer Operations Using a Variety of Methods ○ Investigate Extensions of Whole Number Operations and their Properties: Closed, Commutative, Associative, Distributive- Multiplication over Addition, Identities, Additive Inverse, Multiplication by Zero ○ Define Absolute Value ○ Revisit The Division Algorithm 	20%
<ul style="list-style-type: none"> • Real Numbers: Concepts and Algorithms <ul style="list-style-type: none"> ○ Investigate Practical Uses for Fractions ○ Explore Connections between Fractions, Rational Numbers, Decimals, and Percents ○ Investigate Rational and Irrational Number Representations ○ Explore Concepts and Define/Demonstrate Properties of Rational Number Operations to Include: Additive Inverse, Addition Property of Equality, Multiplicative Identity, Multiplicative Inverse, Distributive Property of Multiplication over Addition, Multiplicative Property of Equality, Multiplicative Property of Zero ○ Investigate Order and Operations in Decimal Form ○ Investigate Irrational Number Order and Operations: Illustrate the Pythagorean Theorem ○ Define and Demonstrate Properties of Real Numbers: Closure, Commutative, Associative, Distributive, Identity, Inverse, Density ○ Develop Proportional Thinking to Include Ratio and Proportion, Properties of Proportions, Fundamental Law of Fractions 	20%

- Explicit instruction in Critical Thinking, Communication and Empirical and Quantitative Reasoning is **in addition to** implicit instruction, modeling and practice that occur **daily** in the discussion of numbers and operations. This explicit instruction **includes** explanation of solving mathematical problems by thinking critically, communicating logically ordered solutions with complete and correct notation, and applying empirical or quantitative skills as appropriate to the problem. 5%

Academic Integrity (Policy A-9.1)

Academic integrity is a responsibility of all university faculty and students. Faculty members promote academic integrity in multiple ways including instruction on the components of academic honesty, as well as abiding by university policy on penalties for cheating and plagiarism.

The penalty for a student found cheating on any part of an assignment, quiz, or exam in this class will range from a grade of zero on the work to a grade of F in the course, and may result in additional, more severe disciplinary measures. A student who allows another to copy his work and the student copying the work are both guilty of cheating. Do your own work. Do not show your completed work to others. Do not allow others to copy your work.

Definition of Academic Dishonesty

Academic dishonesty includes both cheating and plagiarism. Cheating includes but is not limited to (1) using or attempting to use unauthorized materials to aid in achieving a better grade on a component of a class; (2) the falsification or invention of any information, including citations, on an assigned exercise; and/or (3) helping or attempting to help another in an act of cheating or plagiarism. Plagiarism is presenting the words or ideas of another person as if they were your own. Examples of plagiarism are (1) submitting an assignment as if it were one's own work when, in fact, it is at least partly the work of another; (2) submitting a work that has been purchased or otherwise obtained from an Internet source or another source; and (3) incorporating the words or ideas of an author into one's paper without giving the author due credit.

Please read the complete policy at http://www.sfasu.edu/policies/academic_integrity.asp.

Withheld Grades Semester Grades Policy (A-54)

Ordinarily, at the discretion of the instructor of record and with the approval of the academic chair/director, a grade of WH will be assigned only if the student cannot complete the course work because of unavoidable circumstances. Students must complete the work within one calendar year from the end of the semester in which they receive a WH, or the grade automatically becomes an F. If students register for the same course in future terms the WH will automatically become an F and will be counted as a repeated course for the purpose of computing the grade point average. The circumstances precipitating the request must have occurred after the last day in which a student could withdraw from a course. Students requesting a WH must be passing the course with a minimum projected grade of C.

Students with Disabilities

To obtain disability related accommodations, alternate formats and/or auxiliary aids, students with disabilities must contact the Office of Disability Services (ODS), Human Services Building, and Room 325, 468-3004 / 468-1004 (TDD) as early as possible in the semester. Once verified, ODS will notify the course instructor and outline the accommodation and/or auxiliary aids to be provided. Failure to request services in a timely manner may delay your accommodations. For additional information, go to <http://www.sfasu.edu/disabilityservices>.

Acceptable Student Behavior

Classroom behavior should not interfere with the instructor's ability to conduct the class or the ability of other students to learn from the instructional program (see the Student Conduct Code, policy D-34.1 http://www.sfasu.edu/policies/student_conduct_code.asp). Unacceptable or disruptive behavior will not be tolerated. Students who disrupt the learning environment may be asked to leave class and may be subject to judicial, academic or other penalties. This prohibition applies to all instructional forums, including electronic, classroom, labs, discussion groups, field trips, etc. The instructor shall have full discretion over what behavior is appropriate/inappropriate in the classroom. Students who do not attend class regularly or who perform poorly on class projects/exams may be referred to the Early Alert Program. This program provides students with recommendations for resources or other assistance that is available to help SFA students succeed.

Student Learning Outcomes (SLO): At the end of MTH 127, a student who has studied and learned the material should be able to:

1. Solve a variety of problems using multiple problem-solving techniques. [CO: 1,3]
2. Demonstrate understanding of core concepts underlying standard and non-standard algorithmic procedures for performing operations on subsets of real numbers. [CO: 1,3]
3. Communicate his/her knowledge effectively in multiple formats – verbally, concretely, and in writing. [CO: 2]
4. Define, identify, and use the fundamental properties of real number operations. [CO: 3]
5. Provide logical justification of mathematical thinking. [CO: 1]
6. Use mathematical language and notation appropriately to communicate ideas. [CO: 2]