MATH 3308: Survey of Basic Mathematical Theory I

Sul Ross State University ~ Rio Grande College
Summer I, 2017

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Course Description	MTH 3308 is intended as a survey of basic mathematical theory for future elementary teachers.
Course Objectives	Students will explore the foundations of basic arithmetic; work with various numeration systems, with a focus on arithmetic techniques for the Indo-Arabic (base ten) system; use models to illustrate the integers and their basic properties; explore fractions and their uses; be introduced to the rational and real number systems; and use ratios, proportions, and percents to solve applied problems.
TEKS	Information on the Texas Essential Knowledge and Skills can be found on the TEA website: http://www.tea.state.tx.us
Class Time	Tuesday and Thursday, 1:00 – 4:45 p.m.
Class Location	Del Rio 107; Eagle Pass B112; Uvalde B114c
Required Text	Long, DeTemple, & Millman, *Mathematical Reasoning for Elementary Teachers*, Seventh Edition, ISBN 0321900995
Office Hours	By appointment, or most any time you stop by or telephone and I'm in my office, which would typically be on Tuesday and Thursday mornings.

Course Policies

Attendance Policy

Attendance is mandatory. Roll may be called during class. You may be dropped from the course if you accumulate more than nine absences, in accordance with University policy. One class period amounts to four absences. Arriving in class late or leaving early may be counted as a partial absence. It is your responsibility to notify me if you will be absent for any reason.

This is a summer class, and very fast-paced. If you miss as much as a single class (which amounts to a week and a half in the long semester) then you're already significantly behind. Hit the ground running and keep up from the very beginning, and you'll do fine.

You will be held responsible for all material covered in class or the assigned text. If you have to miss a class, it is your responsibility to obtain all notes, assignments, and announcements from someone else in the class. Make-up exams will be given only in the event of an emergency, in which case written justification and/or documentation must be provided and approved.

Communication

I will post course documents, assignments, and announcements on the Blackboard system. You will also occasionally turn in assignments through Blackboard. You should make sure you know how to access and use it; in particular, you need to make sure that you are checking the e-mail address listed there.

E-mail is the best way to contact me. You are also welcome to stop by my office if you wish to speak about the content or your progress in the course.

I am here to help you. Ask questions in class, call me, e-mail me, or come to my office. If you don't communicate with me, then I can't help you. Don't wait until it's too late.

Homework

Homework will be assigned for each section that we cover in the text. Although the homework will not be collected and graded, you should regard it as the most essential component of the course. It is very important that you complete each homework assignment before the next class period. This will allow you to make the most of our time together. If you have a question, ask about it. If you don't understand the homework, you are not ready to take the exam.

In order to achieve success in this course, you must work all the homework assignments in a timely manner!!! The amount of work for any college class is generally calculated as 3 hours of outside work for each hour in class. **That means you should expect to spend as much as 20 hours each week on outside work in this course.** If you don't have that kind of time, you may not want to take this course as a summer class.

We will always have time to discuss the homework in class, and we may also work on problems together in groups. You should come to class prepared: make sure to have your textbook and suitable writing materials with you.

Grading Policy

Your grades will be weighted as follows:

Midterm Exam	40%
Final Exam	60%

A student who averages at least 90% will receive an A; at least 80% will receive at least a B; at least 70% will receive at least a C; at least 60% will receive at least a D.

Exams

There will be one midterm exam. Its tentative date is Tuesday, June 20. This is subject to change. You will be notified of a change in advance. Make-up exams will be given **only in the event of an emergency**, in which case written justification and/or documentation must be provided and approved.

The final exam is scheduled for July 3. The final exam will be comprehensive.

Subject Outline

Below is a tentative outline of the subjects we will cover in this course. We will adhere to the textbook fairly closely. Next to each topic section is the corresponding section from the textbook.

I. Sets and whole numbers

1. Sets (§2.1): *basic concepts – notation – set operations and relations*
2. The whole numbers (§2.2): *the history and psychology of counting – one-to-one correspondence – counting and cardinality – the less-than relation*
3. Addition and subtraction of whole numbers (§2.3): *addition of whole numbers – models for addition – properties of addition – subtraction of whole numbers – models for subtraction*
4. Multiplication and division of whole numbers (§2.4): *multiplication of whole numbers – models for multiplication – properties of multiplication – division of whole numbers – models for division – division with remainders*

II. Divisibility

1. Divisibility (§4.1): *divisors and multiples – odd and even – prime numbers – factor trees – prime power representations – applications – two questions about primes – the Sieve of Eratosthenes*
2. Greatest common divisors (§4.3): *the greatest common divisor – the listing method – the prime factorization method – the Euclidean algorithm – the least common multiple – methods*

III. Numeration and computation

1. Numeration systems (§3.1): *primitive systems – the Egyptian system – the Roman system – the Babylonian system – the Mayan system – the Indo-Arabic system*
2. Algorithms for adding and subtracting whole numbers (§3.2): *addition with representations and manipulatives – subtraction with representations and manipulatives*
3. Algorithms for multiplying and dividing whole numbers (§3.3): *multiplication with representations and manipulatives – the lattice method – multiplication in nondecimal systems – division with representations and manipulatives*

IV. Integers

1. Representations of integers (§5.1): *the integers – what we want in a representation – colored counters – mail-time (money) stories – number-line representations*
2. Addition and subtraction of integers (§5.2): *addition with representations and manipulatives – properties of addition – subtraction with representations and*

manipulatives – ordering the integers

3. Multiplication and division of integers (§5.3): *multiplication with representations and manipulatives – properties of multiplication – division of integers*

V. Rational numbers

1. Fractions (§6.1): *basic concepts – representations and manipulatives – equivalent fractions – fractions in simplest form – common denominators – ordering*
2. Addition and subtraction of fractions (§6.2): *addition of fractions – addition with manipulatives – proper fractions and mixed numbers – subtraction of fractions – subtraction with manipulatives*
3. Multiplication and division of fractions (§6.3): *multiplication of fractions – multiplication as an operator – the area model – division of fractions – division with pictures – the invert-and-multiply rule*
4. Rational numbers (§§6.1,4): *the rational number system – properties of arithmetic – the density property – applications*

Schedule

This schedule is tentative only. The unit numbers refer to the above outline.

June 1 – 8	Unit I
June 8 – 13	Unit II
June 13 – 22	Unit III
June 20	Midterm Exam
June 22 – 27	Unit IV
June 27 – 29	Unit V
July 3	Final Exam

Americans With Disabilities Act

Sul Ross State University is committed to equal access in compliance with the Americans With Disabilities Act of 1973. It is the student's responsibility to initiate a request for accessibility services. Students seeking accessibility services must contact Kathy Biddick, Student Services Administrative Secretary.