Location: SLC 205

Semester / Year: Fall 2017

Course Start Date: Wednesday, August 23, 2017

Course End Date: Friday, December 01, 2017

Professor Name: Amy Freier

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Course Description:

Mathematics 277 is designed to broaden, strengthen, and apply arithmetic concepts to the solution of problems. Arithmetic content includes whole number operations, number bases, numeration systems, modular arithmetic, place value, measures of central tendency, number theory topics, sets, relation domains, integers, and rational fraction topics including proportional reasoning. The course integrates the understanding of arithmetic content with the understanding of how students learn arithmetic concepts. Applications of algebra are integrated into the first chapter on problem solving and reinforced throughout the course.

Concepts covered in Math 277 will include: introduction to problem solving; sets, whole numbers, and numeration; whole number operations and properties; whole number computation – mental, electronic, and written (chapters 2 and 3) ; number theory (chapters 3, 4, and 5), fractions, decimals, ratio, proportion, and percentages (chapter 7); integers (chapter 8); rational numbers and real numbers (chapter 9); algebra(chapter 2, 9, and end of the year review); statistics and probability (chapters 10 and 11). The course will cover chapters 1-7, from the text while Math 278 covers chapters 8-16 in the text and algebra.

Standards:

The content of Math 277 and Math 278 combine to meet the **North Dakota Programs Approval Standards and Criteria addressed in 50015.2c Mathematics** The program requires the study of mathematics. Candidates know, understand, and use the major concepts, procedures, and reasoning processes of mathematics (chapters 1-4) that include number and operations (chapters 3,5,and 9), algebraic thinking (chapter 9), geometry (chapters 12, 14, 15, and 16), measurement (chapter 13) and data, statistics and probability (chapter 10) in order to foster problem solving activities.

INTASC standards

Standard 4: Content Knowledge: The teacher understands the central concepts, tools of inquiry, and structures of the disciplines(s) he or she teaches and creates learning experiences that make these aspects of the discipline accessible and meaningful for learners to assure mastery of the content.

Standard 5: Application of Content: The teacher understands how to connect concepts and use differing perspectives to engage learners in critical thinking, creativity, collaborative problem solving related to authentic local and global issues.

Standard 8: Instructional Strategies: The teacher understands and uses a variety of instructional strategies to encourage learners to develop deep understanding of content areas and their connections, and to build skills to apply knowledge in meaningful ways.

Math 277 is based on the National Council of Teachers of Mathematics (NCTM) vision of what school mathematical learning could and should be. [The standards are available at www.nctm.org/] The course also derives guidance in direction from the standards for the preparation of elementary school teachers from the Interstate New Teacher Assessment and Support Consortium (INTASC), the Education Standards and Practices Board (ESPB) of North Dakota, and consideration of PRAXIS I & II mathematics testing requirements for elementary teachers necessary for licensure in North Dakota.

Course Objectives:
Upon successful completion of this course and MATH 277, learners will be able to:
1) Understand and apply basic arithmetic content algebra to the solution of problems.
2) Have a strong mastery and foundational background of mathematics concepts learned in K-8 curriculum.
3) Begin developing a thought process of how they connect with mathematical content, and consider how their peers and their future students may learn math concepts differently.
4) Integrate multicultural awareness in the field of mathematics.
5) Participate with peers and the instructor by contributing solutions and processes used to solve problems using multiple strategies and to engage in discussions in both small group work and in a full class setting.
6) Experience technology used in educational communication and mathematical problem solving to gain awareness and begin to consider future decisions about appropriate use of technology as a future educator.
7) Reflect and communicate awareness of positive and negative mathematical experiences to discover more about themselves as learners and to gain realizations about how others gain knowledge of and work through challenges in understanding mathematical concepts.

Mathematics 277 is the first course in a two-course sequence of required mathematics courses for pre-service elementary teachers. Mathematics 278 is the second course of the sequence (offered in the spring semester). The purpose of Mathematics 277 and 278 in the curriculum is to teach mathematical concepts and skills for pre-service elementary teachers. (Learning experiences in Math 277 and Math 278 may influence pre-service elementary majors as teachers, but the courses' primary purpose involves understanding math content while Math Methods emphasizes pedagogy.)

Institutional Mission Statement:

Trinity Bible College and Graduate School is committed to training and educating people with theological reflection and missional passion, in order that people and communities everywhere will hear the good news of Jesus and see His love demonstrated.

Spiritual Formation Statement:
Mathematics is a discipline that strengthens rather than challenges faith. Mathematics is built upon these truths that simply are. It is from these truths that the thermos rest. In much the same way, our faith is built upon these truths that cannot be proven, but simply are and likewise from these truths we build our doctrine.

Required Textbooks:
Musser, Gary L., William F. Burger, and Blake E. Peterson. *Mathematics for Elementary Teachers: A Contemporary Approach*. 10th ed. Hoboken, NJ: Wiley, 2014. Print.

Course Outline:
Wed., Aug 23: Syllabus, Introduction to Problem Solving 1.1, Math Assessment
Fri., Aug. 25: 1.1
Mon., Aug. 28: 1.2
Wed., Aug. 30: 1.2
Fri., Sept. 1: Activity, Essay Due
Mon., Sept. 4: No School: Labor Day
Wed., Sept. 6: Chapter 1 review
Fri., Sept. 8: Chapter 1 Test
Mon., Sept., 11: Sets, Whole Numbers, and Numeration 2.1
Wed., Sept. 13: 2.1
Fri., Sept. 15: 2.2
Mon., Sept. 18: 2.2 and 2.3
Wed., Sept. 20: Chapter 2 review
Fri., Sept. 22: Chapter 2 Test
Mon., Sept. 25: Whole Numbers: Operations and Properties 3.1
Wed., Sept. 27: 3.2
Fri., Sept. 29: 3.3 and review
Mon., Oct. 2: Chapter 3 test
Wed., Oct. 4: Chapters 1-3 review
Fri., Oct. 6: Test over chapters 1-3
Mon., Oct. 9: Whole Number Computation – Mental, Electronic,, and Written 4.1
Wed., Oct. 11: 4.2
Fri., Oct. 13: 4.3
Mon., Oct. 16: Chapter 4 Review
Wed., Oct. 18: Chapter 4 Test
Fri., Oct. 20: No School: Fall Break
Mon., Oct. 23: Number Theory 5.1
Wed., Oct. 25: 5.2
Fri., Oct. 27: Chapter 5 Review
Mon., Oct. 30: Chapter 5 test
Wed., Nov. 1: Fractions 6.1
Fri., Nov. 3: 6.2
Mon., Nov. 6: 6.3
Wed., Nov. 8: Chapter 6 Review
Fri., Nov. 10: Chapter 6 Test
Mon., Nov. 13: Decimals, Ratio, Proportion, and Percent 7.1

Wed., Nov. 15: 7.2
Fri., Nov. 17:7.3
Mon., Nov. 20: 7.4
Wed., Nov. 22: No School: Thanksgiving
Fri., Nov. 24: No School Thanksgiving
Mon., Nov. 27: Chapter 7 Review
Wed., Nov. 29: Chapter 7 Test
Fri., Dec. 1: Review Chapters 4-7
Mon., Dec. 4: Final

Methodology:
Lectures and class discussion, reflective responses, modeling/demonstrating, quizzes/tests, in-class assignments, cooperative learning groups, and math practice assignments.

Course Requirements:

A. **Classroom Behavior Expectation**

Proper classroom behavior and respect for the instructor during lectures and for those who are speaking in class is expected. The following will not be tolerated: excessive talking, sleeping, passing notes, or any other disruptive behavior. This is an important college level course and your attention and participation is crucial for optimal learning.

Students are expected to read the assigned material **before** they come to class, as well as be an *active participant* in class discussions and activities. Questions are always welcomed and will increase your learning experience! **Class time will involve student-driven learning activities, often done in groups. Active learning through discovery and inquiry will be the culture of the classroom.**

B. **Attendance**

Regular, punctual class attendance is essential for the satisfactory completion of a course. Students are expected to attend all sessions, complete all assigned work, and take all examinations. Regular attendance will help students master the content of the course under the instructor's leadership and from group interaction.

Students who miss a class for any reason, including those who participate in college-sponsored activities, are accountable for all required assignments and examinations. Students should also realize that promptness and punctuality are vitally important to the learning process. Tardiness will not be tolerated, and three instances of tardiness will result in one absence. Also, lateness in excess of 10 minutes will result in an absence, as will leaving the classroom early without the prior approval of the instructor. Total absences exceeding 25% (12 classes) of the class time may result in failure of this course.

C. **Assignments**
   i. **Reflective paper:** In a one-two page typed essay, please answer the following questions? Why do children need to learn mathematics? Explain your previous experiences, triumphs and disasters in mathematics. Are people from varying cultures and backgrounds taught math equally? Why does our world need math? How do you use mathematical skills in your life? What should an elementary educator <u>know</u> about mathematics and <u>be able to do as a teacher</u>?
   ii. **In class Activities and Participation**
   iii. **Homework:** Homework will be assigned for each section covered in the text.

      iv.   **Exams** will be centered on each chapter and continued throughout the semester.

Grading Procedure:

In-Class Assignments/Activities including Essay	15%
Homework including Essay	40%
Chapter Tests	45%

A. Assignment Expectations

1. Unless otherwise stated, all exams will be open notes (<u>not</u> open book). Therefore, it will greatly benefit you to take good notes during class.

2. Calculators will be allowed for most assignments; however certain assignments may prohibit calculator use.

B. Late Assignment Policy

It is the professor's preference that all assignments are turned in on time. In order to reward those students who prioritize their schedules to make sure that happens, the following policy will be followed:

1. Quizzes/Exams: Due to the nature of this course, exams must be taken and turned in on time. Those who may miss an exam or not finish an exam can have until the next time the class meets to finish, but this must be done in the ACS Lab, whatever not finished before the next class will be counted off.

2. Homework: Since successful math instruction requires practice, all homework assignments should be completed before the next class period. While homework questions may be asked the following class period, the entire homework assignment needs to be completed. During the homework question time, work may be changed. Any homework assignment that has not been turned in by the test date will receive a zero.

3. The above policy will be followed. However, the instructor reserves the right to make adjustments in the event of highly unusual circumstances.

Selected Bibliography:

Bahr, Damon L. & Garcia, L. *Elementary Mathematics is Anything but Elementary*. Belmont, CA: Wadsworth Publishing, 2010. Print.

Smith, Lambdin, Lindquist, et. al. *Teaching Elementary Mathematics: A Resource for Field Experience.* Hoboken, NJ: John Wiley & Sons, 2004. Print.

Additional Material / Addendums

This syllabus is provided to students and participants for their general guidance only.
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