



SOUTHERN CONNECTICUT STATE UNIVERSITY
MAT 105 * Mathematics for Elementary Education I**
Tuesday and Thursday

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Office Hours: M 3-5 pm
T and R 9:30-11 am
And by appointment

Course number: MAT 105 Credit Hours: 3 Prerequisite(s): Mathematics Placement Exam
Course Title: Mathematics for Elementary Education I

COURSE DESCRIPTION:

Problem Solving Strategies; Numeration Systems; Whole Numbers Properties and Operations; Number Theory; Integers – properties and operations. Required for all students in an elementary school certification and course satisfies the All -University requirement.

COURSE'S CONTRIBUTION:

MAT 105 is the first semester in the MAT 105-106 sequence for elementary education majors. It is mainly a content course, but methodology is discussed as well. The topics are those typically covered in elementary grades. This course meets for three (3) hours for lectures and hands-on activities.

The mathematics content is divided into four main areas: 1) Problem Solving Strategies 2) Set theory 3) Number Systems: natural numbers, whole numbers and integers 4) Number Theory

During the semester's work students revisit the above topics of mathematics for elementary grades through lecture and through hands-on activities. Students use manipulatives such as color tiles and pattern blocks (problem solving strategies); attribute blocks (set theory); base ten blocks (whole numbers and operations); two-color counters (integers and their operations). Mental mathematics and estimation skills are incorporated through the semester's work.

Through the lectures and the activities students investigate concepts of the above mathematical topics. For example with the use of pattern blocks students investigate patterns and connect them to functions; with the use of attribute blocks students explore sets, union of sets and intersection of sets; with the use of the base ten blocks the students explore the properties and operations of the whole numbers; and with the use of two-color counters students explore the rules for the operations of integers. There are four laboratory activities rough the semester that the students have to complete, reflect on their learning and hand in for credit. Also, through the semester, one or two elementary grades visit the university and MAT 105 students work with the youngsters on one of the above activities teaching them the mathematical concepts.

LEARNER OUTCOMES & ASSESSMENTS

1. Students will extend their understanding and strategies on problem solving. (INTASC 1; NCATE 1.5.1; CCCT 1.3)
2. Students will demonstrate knowledge of the number systems. (INTASC 1; NCATE 1.5.1, 1.5.2, 1.5.3; CCCT 1.2, 1.3)
3. Students will demonstrate knowledge of estimation strategies and mental computation techniques. (INTASC 1; NCATE 1.5.4, 1.5.5; CCCT 1.2, 1.3)
4. Students will model, explain and develop a variety of computational algorithms (INTASC 1; NCATE 1.5.6; CCCT 1.2, 1.3)

Above outcomes will be assessed through midterm and final exam; through quizzes; in-class hands-on activities and homework assignments. In addition, students are assessed through a written report reflecting on their experiencing with the elementary grades students.

MODES OF LEARNING

1. Lecture
2. Individual and Group work
3. Hands-on activities
4. Students teaching elementary school youngsters
5. Reflective paper on learning

COURSE CONTENT OUTLINE

1. Problem Solving (two weeks)
Hands-on Activities
Quiz 1
2. Set Theory (two weeks)
Hands-on Activities
Quiz 2
3. Number Systems (two weeks)
Midterm Exam
4. Whole Numbers (three weeks and one-half weeks)
Hands-on Activities
Quiz 3
5. Number Theory (two weeks)
Hands-on Activities
Quiz 4
Elementary School class visitation
6. Integers (three weeks)
Hands-on Activities
Final Exam

REQUIRED TEXT(S)

- (1) **A Problem Solving Approach to Mathematics for Elementary School Teachers**, by Billstein, Libeskind, and Lott. Published by Addison Wesley Longman; 7th edition; 2001.
- (2) **Mathematical Investigations for the Elementary Grades**, by Richard DeCesare and Maria Diamantis. Published by Addison Wesley/Pearson Custom Publishing; 1st edition; 2002.

COURSE REQUIREMENTS

Above Learner Outcomes 1-4, are assessed through:

Quiz 1, Quiz 2, Quiz 3, and Quiz 4

Five Hands-on Activities

Elementary School Visit

Midterm Examination

Final Examination

EVALUATION CRITERIA

Grades are based on the combination of quizzes, exams, hands-on activities and the elementary visit. The breakdown is:

Quizzes (4; 25 points each)	20 %
Hands-on Activities (5; 20 points each)	20 %
Elementary Visit (1; 10 points)	20%
Midterm Exam (1; 100 points)	20 %
Final Exam (1; 100 points)	20 %

Grades are assigned as follows: 90-100 A; 80-89 B; 70-79 C; 60-69 D; Below 60 F; “+” and “-” are also used

Homework Policy: Students are required to do all homework – problems for the quizzes come from the homework problems

Attendance: Students are expected to attend all classes, attendance will be taken every day.

Calculators: Students are required to have a scientific calculator for classroom use.

Late Withdrawals: Late withdrawals are granted only in extreme circumstances, failing of the course is not such extreme circumstance.

Incompletes: may be given in extreme situations with documentation of the reasons.

STRATEGIES FOR SUCCESS:

Attend all classes. Mathematics is not a spectators' sport! Read and do all homework assignments and ask questions in class. The problems on the quizzes and on the exams will be chosen from the homework problems. Thus, if you can do the homework problems, you will do fine on the quizzes and on the exams. If you have difficulty with the material, seek my assistance during office hours. Expect to study outside the class in the ratio of two hours for each hour of class time. Visit me during office hours for any problems that might arise during the semester. Once the semester is over, I can't change the grade.

STUDENTS WITH DISABILITIES:

Students that need special accommodations, please come and see me during my office hours, so that we can discuss on strategies to support your needs. The Disability Resource Office is located in EN 15 if anyone wishes to speak with our officers or to make arrangements for extended testing hours. I am here to assist you, please let me know what I can do.

BIBLIOGRAPHY:

1. Bassarear, T. 2001. *Mathematics for Elementary School Teachers*. Second Edition. Boston: Houghton Mifflin.
2. Musser, G., W. Burger, and B. Peterson. 2001. *Mathematics for Elementary Teachers*. Fifth Edition. New York: John Wiley & Sons.
3. National Council of Teachers of Mathematics. 2000. *Principles and Standards for School Mathematics*. Reston, VA: NCTM.

STANDARDS GUIDELINES

INTASC [Interstate New Teachers' Assessment & Support Consortium] STANDARDS

S

1. Knowledge of subject matter
2. Knowledge of human development & learning
3. Instruction adapted to meet diverse learners
4. Use of multiple instructional strategies & resources

A

5. Effective learning environment created
6. Effective communication
7. Lesson planning

I

9. Reflection and professional development

L

8. Assessment of student learning to improve teaching

S

10. Partnership with school and community

NCATE – NCTM STANDARDS (National Council of Teachers of Mathematics)

OUTCOMES FOR GRADES K-4 TEACHERS WITH MATHEMATICS EMPHASIS

- 1.5 Programs prepare prospective teachers who can –
 - 1.5.1 demonstrate knowledge of the development, use, and multiple representation of numbers and number systems
 - 1.5.2 demonstrate number sense and knowledge of number systems
 - 1.5.3 model the use of the four basic operations in multiple contexts
 - 1.5.4 use a variety of mental computation techniques
 - 1.5.5 apply estimate strategies to quantities, measurements, and computation to determine the reasonableness of results
 - 1.5.6 model, explain, and develop a variety of computational algorithms
 - 1.5.7 apply the process of measurement to two-and three-dimensional objects using nonstandard, customary, and metric units
 - 1.5.8 use geometric concepts and relationships to describe and model mathematical ideas and real-world constructs
 - 1.5.9 collect, organize, represent, analyze, and interpret data
 - 1.5.10 apply concepts of probability to real world situations
 - 1.5.11 describe and represent mathematical relationships
- 1.6 Programs prepare prospective teachers who have a knowledge of historical development in mathematics that includes the contribution of underrepresented groups and diverse cultures.

CCCT [CONNECTICUT COMMON CORE OF TEACHING]

DEMONSTRATIONS OF KNOWLEDGE

- 1.1 understanding of student learning & development
- 1.2 understanding of need for different learning approaches
- 1.3 proficiency in reading, writing and mathematics
- 1.4 understanding of central concepts & skills, tools of inquiry and structures of discipline(s)
- 1.5 knowledge of how to design and deliver instruction
- 1.6 recognition of need to vary instructional methods

APPLICATION OF KNOWLEDGE THROUGH

- 2.1 instructional planning based upon knowledge of subject, students, curriculum & community
- 2.2 selection and/or creation of learning tasks that make subject meaningful for students
- 2.3 establishment and maintenance of appropriate behavior standards and creation of positive learning environment
- 2.4 creation of instructional opportunities supporting students' academic, social and personal development
- 2.5 use of verbal, nonverbal and media communication fostering individual and collaborative inquiry
- 2.6 employment of various instructional strategies in support of critical thinking, problem solving and skills demonstration
- 2.7 use of various assessment techniques to evaluate student learning & modify instruction

DEMONSTRATION OF PROFESSIONAL RESPONSIBILITY THROUGH:

- 3.1 professional conduct in accordance with the Code of Professional Responsibilities for Teachers
- 3.2 shared responsibility for student achievement and well-being
- 3.3 continuous self-evaluation regarding choices & actions on students and school community
- 3.4 commitment to professional growth
- 3.5 leadership in the school community
- 3.6 demonstrations of a commitment to students and a passion for improving the profession