

## OFFICIAL SYLLABUS

DISCIPLINE: EDSP  
COURSE: 445

### A. Catalog Entry

EDSP 445: Adaptive Strategies in Mathematics  
Abbreviation: (ADAPT STRAT MATH)

(3) Three hours lecture

Prerequisites: EDSP 360 or EDSP 361, and 2.5 GPA

Prospective educators are prepared with the background knowledge and skills necessary to promote literacy in mathematics for diverse learners. An emphasis is placed on research based techniques, strategies, and technologies to improve teacher instruction and student understanding of mathematical skills and concepts.

### B. Detailed Description of Content of Course

Prospective educators are prepared with the background knowledge and skills necessary to promote literacy in mathematics for diverse learners. The course addresses the following topics related to improving teacher instruction and student understanding of mathematical skills and concepts:

- Math Foundations—Connect self-reflection of math beliefs with recognized theorists in context with the vision and content of mathematics in the 21<sup>st</sup> century.
- Lesson Design—Plan and implement research supported lesson design that follows national, state, local curricula standards and addresses culture, linguistic, individual, and gender differences.
- Problem Solving—Identify teaching strategies for solving word/story problems using the method of inquiry and real world applications.
- Assessment—Develop and use a variety of formative, summative, traditional, and alternative assessments to identify students' mathematical understanding that will guide instructional decisions.
- Student Learning/Teaching Strategies—Articulate how all students, including students with special needs learn mathematics using multiple strategies including listening to and understanding how students think about mathematics.

### C. Detailed Description of Conduct of Course

This course is conducted with emphasis on practical application of the subject matter through student participation and discussion, individual and collaborative group projects, presentations and demonstrations, technology applications, videos,

readings, lecture, cooperative learning activities, written exams, and study guides.

#### **D. Goals and Objectives of the Course**

Goals, objectives, and assignments in this class address NCATE Standard 1c Professional and Pedagogical Knowledge and Skills and 1g Dispositions. The course goals, objectives, and assignments also address CEC Content Standard 4 and 7.

The codes included below refer to the NCTM standards, CEC Knowledge and Skill Standards and the Virginia Department of Education teacher licensure competencies. Code for CEC Standards: CC = Common Core; GC = General Curriculum. Code for VADOE Standards: VGCA = Virginia's General Curriculum PART A; VGCB = Virginia's General Curriculum PART B; VHI=Hearing Impairments; VVI=Visual Impairments; VPS = Virginia's Professional Studies; VEC = Virginia Early Childhood. Other Codes: NAEYC=National Association for the Education of Young Children; NCTM=National Council for Teachers of Mathematics

Upon successful completion of this course the students will be able to:

1. Describe the basic math concepts and skills taught in Pre-K - 8<sup>th</sup> grade (K-12<sup>th</sup> grade for graduate students in special education). (CC7K2, CC7K3, VGCA2b2, 4, VGCB2a, NAEYC 4, VEC2b)
2. Identify foundations of math education and goals for mathematics education in the twenty-first century. (CC7K1, NCTM 8-13)
3. Define a mathematical concept addressed in curricula standards and give several examples using concept-diagramming tools. (CC7K3, GC7S2, GC4S13)
4. Describe and contrast the developmental learning theories of Piaget, Vygotsky, and others. (CC7K1)
5. Explain Bruner's Three Levels of Concept Representation and Gagne's Systematic Application of Task Analysis. (CC7K1, CC7S5, VGCA2b6, VGCB2a1)
6. Describe the cognitive process of instruction (CPOI) and its relationship to other teaching models and create the visual representation of CPOI for several math competencies. (VGCA2b4-8, GC7S2, 3, NCTM 2-6, NAEYC4, VEC2, VPS2)
7. Conduct a task analysis in order to identify pre-requisite skills for math competencies from the Standards of Learning (SOL). (CC7S5, VGCA2b6, VGCB2a1)
8. Identify teaching strategies for solving word/story problems using the method of inquiry and real world applications. (CC4S2, VGCA2b5, GC7S2, 3)
9. Identify students' math errors and suggest instructional approaches to modify their misconceptions. (CC7S13, 15, CC8S8, 9, GC4S12, VGCB2b, c)
10. Discuss the relationship between concept development in math and the use of manipulative aids. (CC7S8, GC4S13)
11. Develop and use a variety of formative, summative, and alternative

assessments to identify student mathematical understanding and will guide instructional decisions. (CC8S5, VGCA2b4, 6, NAEYC3)

12. Identify research based instructional strategies for teaching basic math skills and articulate how all students, including students with disabilities learn mathematics using multiple strategies. (CC4S3, GC4S1-2, GC4S5, GC4K6, GC7S2, 3, VGCA2b4-8, VEC2b, VPS2)
13. Listen to and understand how students think about mathematics (GC7S2, CC4S3, NCTM 8, 14)
14. Model methods for increasing accuracy and proficiency in math calculations and applications. (GC4K6, GC7S2, CC4S3, NCTM 8, 14)

#### **E. Assessment Measures**

1. Formal tests and/or quizzes to assess mastery of course goals
2. Class participation in discussions, small group activities, and reflective writing
3. Professionally-written responses to readings submitted electronically (following APA style/format and adhering to standard written English conventions)
4. Real-life word problem where each participant, with one or two partners, will develop a real-life word problem to present to the entire class for their solution. Participants will demonstrate the solution of their word problem at all three levels of Bruner's concept development. (technology task)
5. Develop a detailed lesson plan on a math concept and competency using the Cognitive Process of Instruction, culminating in a professional lesson/presentation to facilitate class understanding of the topic. (technology task)
6. Develop materials describing your knowledge of various math facts properties and alternative math strategies in addition, subtraction, multiplication, and division and demonstrate a strategy. (technology task)
7. Applied technology assignment involving student identification of Web-based resources for teachers and examination of how these resources can benefit diverse learners.

#### **F. Other Course Information**

Graduate students enrolled in EDSP 545, Adaptive Strategies in Mathematics are expected to complete an additional project involving assessment of a student struggling in mathematics followed by a plan for instruction to address the needs of the student.