Theme: Preparing Inquiring Educators: Knowledge, Understanding and Application

1. **Course Title and Number of Credits**: ELCL 615 Exploration of Number and Algebra
   3 Graduate Credits

2. **Course Description**: This course will prepare teachers to present algebra, probability and statistics as meaningful and tangible areas of mathematics. Manipulatives used to enhance the teaching of related concepts will be explored. Students will examine and model the NCTM standards pertaining to these areas of mathematics. Central to the course will be the identification and investigation of the set of real numbers, algebraic concepts, probability exercises and the compilation and analysis of data.

3. **Pre- or Co- requisites**: None

4. **Course Objectives**: In the areas of algebra, probability and statistics, students will:
   1. Become familiar with the NCTM standards for teaching and assessment.
   2. Become familiar with manipulatives used to enhance teaching and learning.
   3. Become familiar with the use of technology to enhance teaching and learning.
   4. Become familiar with contemporary assessment tools and procedures.
   5. Reflect on appropriate practice.
   6. Apply their knowledge of appropriate practice to the evaluation of lessons.
   7. Increase their knowledge of these concepts.
   8. Compare, contrast and implement a variety of problem-solving methods.
   9. Use their knowledge to create appropriate and effective lessons and curricula.

5. **Student Learning Outcomes**:
   1. In order for students to learn how to integrate mathematics an science in a meaningful way, they will design, conduct and present a real-life integrated mathematics and science project. Students will choose a plant, an animal, or any natural phenomena, such as weather, to observe throughout the semester. They will keep a daily journal as they observe and measure all charges such as temperature, rainfall, humidity, weight, height and number of parts (i.e. leaves). Students will use graphs and other methods to represent and present collected data.
   2. Each students will create and present a middle school or high school Algebra lesson. These lessons must be infused with the use of motivational activities and appropriate technology. Lessons must be prepared and presented in accordance with the C\NCTM and New Jersey CORE Curriculum Standards.
3. Students will assess lessons presented by the instructor and/or other students as a part of their preparation according to the assessment standards proposed by the NCTM. They will create their own rubric for open-ended assessment items. Students will also develop items for their own mid-semester and/or final examination(s).

4. Students will review and present current research on the teaching and learning of Algebra.

5. In order to acclimate students to the task of conducting and reporting a study, they will write and present a proposal to study any Algebra teaching and/or learning strategy.

6. **Course Content:**
   
   A. Exploration of Numbers
   - Natural Numbers
   - Prime Numbers
   - Whole Numbers
   - Integers
   - Rational Numbers
   - Irrational Numbers
   - Real Numbers

   B. The Nature of Algebra
   - Variables
   - Polynomials
   - Equations
   - Inequalities
   - Ratios and Proportions
   - Decimals, Fractions and Percents
   - Problem Solving
   - Manipulative Exercise in Algebra

   C. Probability and Statistics
   - Probability Models
   - Combination and Pascal's Triangle
   - Compilation and Analysis of Data
   - Representation of Data
   - Interpretation of Data
   - Manipulative Exercises in Probability and Statistics

   D. Authentic Reinforcement and assessment in Algebra, Probability and Statistics

7. **Teaching/Learning Methods:**
1. Lecture and demonstration
2. Student presentations
3. Simulation and Role Play
4. Group Discussions
5. Problem-solving activities
6. Discovery exercises
7. Reflection Papers

8. Evaluation Methods:
   1. Real-life mathematics/science project
   2. Presentation on current research in Algebra
   3. Algebra Research proposal
   4. Student-developed final examination
   5. Attendance, class participation and contribution

9. Recommended Textbook:

10. Preparer's Name and Date: Althea Hylton-Lindsay, Fall 1996

11. Department Approval Date: Fall 1996

12. Reviser's Name and Date: Althea Hylton-Lindsay, Fall 1999

13. Department Revision Approval Date: Fall 1999

14. BIBLIOGRAPHY:


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CIEE 615 Course of Study