Millersville University
Math 105
Fundamentals of Mathematics II, 3 credits

Course Description:
     An extension of Math 104, this course covers additional mathematics topics that are relevant to the teaching of elementary mathematics. Topics include an extensive examination of geometry and measurement, and probability and statistics. Additionally, there will be a continued emphasis placed upon the development of problem solving and reasoning skills. Attention will be given to how the content addresses the PA Department of Education Mathematics *Standards* and the NCTM *Principles and Standards for School Mathematics*.
     This course is required for all elementary education and special education majors.

Prerequisite: Math 104 (C or better), and at least an 80% passing score on the Mathematics Department Basic Skills Test prior to course enrollment.

Course Objectives: Students will be able to
- o Demonstrate knowledge of the concepts, procedures and skills necessary to teach K-6 mathematics: specifically pertaining to geometry, measurement, statistics, and probability.
- o Communicate and model important mathematical concepts in geometry, measurement, statistics, and probability using a variety of mathematical strategies.
- o Demonstrate appropriate and correct application of mathematics terminology and symbolism used in geometry, measurement, statistics, and probability.
- o Demonstrate the appropriate use of physical and technological tools for representing and connecting mathematical ideas in geometry, measurement, statistics, and probability.
- o Demonstrate the ability to transfer knowledge and thinking strategies to new situations.

Assessment Tools:
Instructors will make use of a variety of assessment tools in making sure that the students meet the objectives of the course. These may include: in-class activities, graded assignments, projects, presentations or quizzes, as well as exams and a final.

Course Outline:

Topic	*Section (Billstein)*
Concepts of Basic Probability	7.1
Multistage Experiments and Tree diagrams	7.2
Simulations in Probability	7.3
Odds, Conditional Probability and Expected Value	7.4
Statistical Graphs	8.1
Measures of Central Tendency	8.2
Measures of Variation	8.2
Abuses and misuses of Statistics	8.3
Basic Geometric Notions	9.1
Polygons	9.2
More about Angles	9.3
Three Dimensional Geometry	9.4
Geometric Constructions	10.1, 10.3
Congruence	10.2

Similarity	10.4
Linear Equations and the Cartesian Graphing System	10.6
Linear Measurement	11.1
Areas of Polygons and Circles	11.2
Pythagorean Theorem and Distance	11.3
Surface Area	11.4
Volume	11.5
Mass and Temperature	11.5
Translations and Rotations	12.1
Reflections and Glide Reflections	12.2
Symmetries	12.4
Tessellations	12.5

Required Materials:
- Textbook: Mathematics for Elementary School Teachers, 8th Edition, Billstein et al.
- Millersville University Overhead Manipulative Kit (available in bookstore)
- Calculator: (TI-34II will be used for some class instruction)