

## Salisbury University Department of Mathematical Sciences

MATH 150: Data, Probability, and Algebra connections  
Syllabus (Tentative)

**Description:** Focuses on conceptual understanding of statistics, probability, algebra, and connections among them. Develops the depth of understanding needed for teaching elementary and middle school as well as knowledge of content students encounter in later grades. Models the implementation of guidelines for teaching statistics and algebra set forth by the American Statistical Association and the National Council of Teachers of Mathematics. 3 Hours Credit: Meets three hours per week. Meets General Education IVB or IVC.

**Prerequisites:** C or better or concurrent enrollment in MATH 130.

**Credit:** Credit may only be received for one of MATH 150, MATH 155, MATH 213, and MATH 216

**Intended audience:** Students in the Elementary Education Program

**Objective:** To provide an in-depth conceptual understanding of connections among statistics, probability, and algebra content typically found in elementary and middle school curricula. The foundations of algebraic thinking are explored along with how algebraic tools can be used to analyze data. The study of statistical inference is also included to foster horizon knowledge of post-middle school content and to help prospective teachers interpret quantitative educational research. Course pedagogy models how statistical and algebraic concepts should be taught in the elementary grades, based on guidelines for teaching statistics set forth by the American Statistical Association and the National Council of Teachers of Mathematics.

**Textbook:** *Reconceptualizing Mathematics*, 3rd edition by Judith Sowder, Larry Sowder, and Susan Nickerson

**Technology:** Mathematical software accessible via SU computer network or online. Digital mathematical calculators such as Desmos may be required.

Topic	Weeks
<b>Elements of Statistics</b> Introduction to the basics of statistics and types of data.	1.0
<b>Organizing and Displaying Data</b> Displaying categorical and quantitative data, misleading graphs.	1.5
<b>Describing Data with Numbers</b> Measures of center, measures of spread, and measures of position, box-and-whisker plots.	1.5
<b>Probability</b> Elements of probability, basic probability rules, conditional probability and independence, multiplication rules.	1.5
<b>Random Variables and Probability Distributions</b> Random variables, the mean of a random variable, variance and standard deviation, the normal curve.	1.0
<b>Distributions from Random Samples</b> Random Sampling, the distribution of sample means.	1.0
<b>Estimating with Confidence</b> Conceptual meanings of confidence intervals, the effect of sample size, basics of computing.	1.5
<b>Testing Hypotheses</b> Hypothesis tests, the p-value for a test.	1
<b>Algebra &amp; Data Analysis with Two Variables</b> Scatter plots and correlation, Pearson's Correlation Coefficient, slopes, and equations of fitted lines, representing and analyzing quantitative relationships between independent and dependent variables, using graphs and algebra to show quantitative relationships, understanding slope, interpreting change, solving systems of linear equations.	1
<b>Tests</b>	1-1.5
<b>Total</b>	14

#### Evaluation

Assignments, Quizzes	20 – 45%
Tests (2 or 3)	30 – 60%
Comprehensive Final Examination	20 – 30%

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- Free tutoring is available for this course in the Spring and Fall semesters.
  - **Writing Across the Curriculum:** Written work must clearly communicate a meaningful message. Put the best possible effort toward organizing meaningful ideas, using an appropriate voice, creating fluent sentence structures, and editing with the conventions of formatting, mechanics, grammar, and spelling. Evidence of lack of attention to rereading, revising and editing will result in significant grade penalties.
  - Clear descriptions of thought processes, evidence of critical thinking, and effective communication must be demonstrated in written work
  - **NOTE:** Once a student has received credit, including transfer credit, for a course, credit may not be received for any course with material that is equivalent to it or is a prerequisite for it.