SLO Presentation

MATH
Date: 09-15-2022

ISLO

Civic Engagement
• Students will develop values and beliefs in their role as a member of local, national and global societies to promote truth, fairness and goodwill to others. They will use the democratic process to further their values and beliefs and recognize and accept differing perspectives based on cultural diversity. They will engage in actions which provide service to others and have a positive impact on their local community.

Communication and Expression
• Students will demonstrate the ability to effectively and appropriately communicate their thoughts and ideas both in written and oral forms. They will develop verbal and non-verbal delivery skills, in an appropriate manner, to communicate their ideas as well as evaluate the ideas of others in a wide variety of contexts.

Critical Thinking and Quantitative Reasoning
• Students will demonstrate the ability to recognize assumptions within an argument and actively and skillfully analyze underlying reasoning to develop a conclusion. They will apply qualitative and/or quantitative analysis to solve problems, predict outcomes, test hypotheses, and explore alternatives in an ethical manner.

Information Literacy
• Students will demonstrate the ability to determine when gathering additional information is necessary. They will use appropriate resources and technologies to locate, evaluate and incorporate the information when developing supporting arguments and drawing conclusions. Students will also develop the ability to understand any legal, ethical or social issues regarding the use of information.

Personal Knowledge and Responsibility
• Students will develop the necessary skills to define, maintain and complete their personal educational goals. They will learn to work independently to accomplish personal goals toward realizing their full potential academically, physically and emotionally whether for personal enrichment, further education or career advancement.

Science, Engineering, and Math
MATH

Mathematics--AAT

• Students utilize mathematical and problem solving techniques to solve real world applications.

• Student distinguish between differentiation and integration techniques.

• Students employ mathematical symbols, notation and syntax appropriately.

• Students explain definitions and theorems and apply them appropriately in formulating proofs.

• Students use appropriate technology to foster mathematical thinking and understanding.

CSLO

MATH5 - Mathematics Learning Strategies
• Utilize good habits of mind as described by the iFALCON project: focus, advance, link up, comprehend, and embrace new ideas

• Communicate mathematical thinking coherently and clearly with appropriate use of mathematical notation and vocabulary

• Demonstrate the ability to apply general problem-solving strategies and logic to mathematics problems and to problems encountered in real-world situations

• Apply Bloom's taxonomy to mathematics learning by: remembering, understanding, applying, analyzing, evaluating, and creating

MATH20 - Basic Mathematics
• Students will be able to use fractions to solve real world problems.

• Students communicate mathematical thinking coherently and clearly with appropriate use of mathematical notation and vocabulary.

• Students understand numbers, ways of representing numbers, relationships among numbers, and number systems.

• Students understand the meaning and effects of arithmetic operations and properties with whole numbers, fractions, decimals and percents.

• Students recognize, apply and interpret proportional reasoning in a variety of real-world situations involving ratios, rates, proportion, percent and conversions of units.

- Students select and apply appropriate methods and tools for computing with fractions and decimals from among mental computation, estimation, calculators, paper and pencil, depending on the situation.

MATH40 - Prealgebra

- Communicate mathematical thinking coherently and clearly with appropriate use of mathematical notation and vocabulary

- Develop meaning for integers-represent and compare quantities with them

- Develop an initial conceptual understanding of different uses of variables

- Create, analyze, and interpret real world situations using concepts of proportional reasoning. (Including ratios, rates, proportions, percent, geometry and measurement and linear relationships)

- Develop a conceptual and practical understanding of measurement and basic geometry

MATH60 - Elementary Algebra

- Create, analyze, and interpret linear models of real world applications

- Communicate mathematical thinking coherently and clearly with the appropriate use of mathematical notation and vocabulary

- Express answers in complete sentences when appropriate

- Demonstrate an understanding of the meanings of equivalent forms of equations and expressions

- Use appropriate technology to foster mathematical understanding, solve mathematical problems, and judge the reasonableness of their results

MATH70 - Plane Geometry

- Analyze characteristics and properties of two-dimensional and three-dimensional geometric shapes and develop mathematical arguments about geometric relationships

- Demonstrate an understanding of and determine the length, perimeter, area, volume, and angle measures involving plane and solid figures

- Use concepts of similarity and congruence to solve and model real world applications

- Apply a coordinate system to graph and analyze geometric shapes

MATH75 - Mathematical Literacy for College Students

- Apply the concepts of numeracy in multiple contexts

- Interpret and move flexibly between multiple formats including graphs, tables, equations, and words

- Recognize proportional relationships and use proportional reasoning to solve problems

- Use the language of algebra to write relationships involving variables, interpret those relationships, and solve problems

MATH80 - Intermediate Algebra

- Create, analyze, and interpret non-linear models of real world applications

- Communicate mathematical thinking coherently and clearly with appropriate use of mathematical notation and vocabulary

- Express answers in complete sentences when appropriate

- Demonstrate an understanding of relations and functions and convert flexibly among and use various representations for them, including tables, graphs, equations, and verbal descriptions

- Use appropriate technology to foster mathematical understanding, solve mathematical problems, and judge the reasonableness of their results

MATH80A - Intermediate Algebra I

- Create, analyze, and interpret non-linear models of real world applications

- Communicate mathematical thinking coherently and clearly with appropriate use of mathematical notation and vocabulary

- Express answers in complete sentences when appropriate

- Demonstrate an understanding of relations and functions and convert flexibly among and use various representations for them, including tables, graphs, equations, and verbal descriptions

- Use appropriate technology to foster mathematical understanding, solve mathematical problems, and judge the reasonableness of their results

MATH80B - Intermediate Algebra II

- Create, analyze, and interpret non-linear models of real world applications

- Communicate mathematical thinking coherently and clearly with appropriate use of mathematical notation and vocabulary

- Express answers in complete sentences when appropriate

- Demonstrate an understanding of relations and functions and convert flexibly among and use various representations for them, including tables, graphs, equations, and verbal descriptions

- Use appropriate technology to foster mathematical understanding, solve mathematical problems, and judge the reasonableness of their results

MATH104 - Survey of Mathematics
- Compare and contrast linear/exponential growth and decay

- Recognize and apply proportional reasoning techniques

- Conduct probability experiments and compare empirical results with theoretical probabilities

- Identify and interpret valid statistical analysis

- Apply financial models to real world situations by making inferences and drawing conclusions

MATH105 - Activity-Based Probability and Statistics for Elementary and Middle School Teachers
- Select and use appropriate ways to summarize and analyze numerical or categorical data using tables, graphical displays and numerical summary statistics

- Interpret, use, and demonstrate an understanding of measures of center and spread in particular properties of the mean

- Demonstrate an understanding of and apply basic concepts of probability

- Demonstrate an understanding of the role variation plays in statistics

MATH110A - Mathematics for Elementary Teachers
- Students select appropriate strategies to apply in solving a nonroutine problem and explain why the solution makes sense

- Students explain the conceptual foundations for addition, subtraction, multiplication, and division

- Students demonstrate operations with real numbers using both standard and nonstandard algorithms

- Students learn to recognize, analyze, interpret and apply patterns.

- Students demonstrate an understanding of numbers, ways of representing numbers, relationships among numbers, and the number systems

- Students demonstrate a depth of understanding of estimation techniques.

MATH110B - Mathematics for Elementary Teachers
- Analyze characteristics and properties of two- and three-dimensional geometric shapes and develop arguments about geometric relationships

- Apply transformations and use symmetry to analyze mathematical situations

- Demonstrate an understanding of measurable attributes of objects and the units, systems, and processes of measurement

- Apply appropriate techniques, tools, and formulas to determine measurement

MATH112 - Elementary Statistics
- Identify, compute, and interpret basic statistics such as measures of center, variation, and position, and understand the distinction between a statistic and a parameter

- Solve applications problems using the appropriate distribution such as binomial, normal, and sampling

- Construct and interpret confidence interval for appropriate population parameters

- Determine the validity of a statement using hypothesis testing

MATH112S - Enhanced Elementary Statistics
- Identify, compute, and interpret basic statistics such as measures of center, variation, and position, and demonstrate an understanding of the distinction between a statistic and a parameter

- Solve application problems using the appropriate distribution, such as binomial, normal, and sampling

- Construct and interpret confidence intervals

- Determine the validity of a statement using hypothesis testing

MATH114 - College Algebra
- Demonstrate an understanding of the properties of linear, non-linear, and functions, and use them to evaluate expressions, solve equations, and solve applications

- Use technology appropriately to explore and analyze linear, non-linear and functions

- Use simple linear algebra techniques to solve systems of equations

- Explore and analyze conic sections

- Identify geometric or arithmetic sequences and use the Binomial Theorem to expand the power of a binomial

MATH115 - Finite Mathematics
- Demonstrate an understanding of matrices and how to perform operations on them to solve systems of linear equations

- Demonstrate an understanding of linear programming and use graphs or the simplex method to solve linear programming problems

- Demonstrate an understanding of the mathematics of finance, including compound interest problems and annuities

- Demonstrate an understanding of principles of counting, and probability and statistics, including permutations and combinations, conditional probability, and binomial and normal distributions

MATH116 - Calculus for Managerial, Biological, and Social Sciences
- Apply the basic techniques of differentiation and integration to polynomial, rational, exponential, and logarithmic functions to investigate the behavior of mathematical models from the general, social, and management sciences

- Demonstrate an understanding of, apply, and interpret the relationships between derivatives and anti-derivatives in applied and theoretical models

- Interpret and analyze how the techniques of differentiation and integration apply to models of marginal analysis and rates of change.

- Use the topics from calculus in conjunction with the graphing calculator to obtain precise graphs of models, including a graphical analysis of rates of change, concavity, and extrema for the model

MATH140 - Trigonometry
- Demonstrate an understanding of the definitions of the six basic trigonometric functions and use them to evaluate expressions, solve equations, and solve applications

- Demonstrate an understanding of how to select an appropriate trigonometric identity to solve equations involving trigonometric functions

- Demonstrate an understanding of mathematical (trigonometric) symbols, notation, and syntax and use them appropriately

- Explore and analyze trigonometric functions using technology appropriately

MATH150 - Precalculus Math
- Demonstrate an understanding of the properties of linear, nonlinear, and transcendental functions, and use them to evaluate expressions, solve equations, and solve applications

- Explore and analyze conic sections

- Identify a geometric and an arithmetic progression and use the binomial theorem to expand the power of a binomial

- Demonstrate an understanding of and use the principle of mathematical induction

MATH155 - Precalculus
- Demonstrate an understanding and use the properties of trigonometric identities and linear, nonlinear, and transcendental functions to evaluate expressions, solve equations, and solve applications

- Explore and analyze conic sections

- Identify geometric and arithmetic progressions

- Demonstrate an understanding and use the principle of mathematical induction

- Use the binomial theorem to expand the power of a binomial

MATH160 - Discrete Mathematics
- Describe and integrate basic definitions and theorems concerning sets, functions, and relations

- Create and understand a formal proof

- Use mathematical tools of logic and induction and show how these tools apply to computer science

- Use combinations and probability theory required in the design and analysis of algorithms

- Create state and transition diagrams to describe a system

MATH170 - Analytic Geometry and Calculus I
- Demonstrate an understanding of what a derivative is and interpret it in terms of instantaneous rates of change and slopes of tangent lines

- Use the Riemann sum to demonstrate an understanding of the definition of the definite integral

- Apply the concepts of differentiation and integration and problem-solving techniques to application problems

• Demonstrate an understanding of mathematical definitions and theorems and use them appropriately in formulating proofs such as the fundamental theorem of calculus, the squeeze theorem and the mean value theorem

MATH190 - Analytic Geometry and Calculus II

• Apply the concept of inverse to exponential, logarithmic, trigonometric and hyperbolic functions in order to evaluate derivatives and integrals of these functions

• Demonstrate an understanding of the techniques of integration and apply their concepts to applications problems

• Demonstrate an understanding of the notions of convergence and apply them to analyze sequences and series

• Demonstrate an understanding of mathematical definitions and theorems and use them appropriately in formulating proofs such as alternating series estimation theorem and the derivative of an inverse function

MATH220 - Analytic Geometry and Calculus III

• Demonstrate a basic understanding of two- and three- dimensional vectors, the geometry of the plane and space, and apply these concepts in applied problems

• Use partial derivatives to calculate rates of change of multivariable functions

• Use multiple integrals to compute the volume, mass, center of mass, and related quantities for multivariable functions

• Demonstrate an understanding of mathematical definitions and theorems and use them appropriately, such as the fundamental theorem of line integrals, Green's Theorem, the Divergence Theorem, and Stokes' Theorem

MATH225 - CALCULUS III

• Demonstrate a basic understanding of two- and three-dimensional vectors, the geometry of the plane and space, and apply these concepts in applied problems

• Use partial derivative to calculate rates of change of multivariable functions

• Use multiple integrals to compute the volume, mass, center of mass, and related quantities for multivariable functions

• Demonstrate an understanding of mathematical definitions and theorems such as the fundamental theorem of line integrals, Green's theorem, the divergence theorem, and Stokes' theorem, and use them appropriately

MATH240 - Calc & Differ Equations

• Know when and how to perform elementary row operations to solve systems of linear equations

• Students know when and how to perform elementary row operations to solve systems of linear equations.

• Understand the properties of Laplace transforms and be able to solve differential equations by selecting an appropriate inverse transform

• Create, analyze, and interpret a second order differential equation to model a problem involving simple harmonic motion

• Students understand the properties of Laplace transforms and be able to solve differential equations by selecting an appropriate inverse transform.

• Identify a minimal spanning set (basis) for an nth dimensional vector space

• Students create, analyze, and interpret a second order differential equation to model a problem involving simple harmonic motion.

• Students identify a minimal spanning set (basis) for an nth dimensional vector space.

• Students will represent elements of a vector space as a linear combination of basis elements

MATH250 - Linear Algebra and Differential Equations

• Use the concepts of linear algebra to solve systems of both linear and differential equations

• Demonstrate an understanding of the properties of Laplace transforms and be able to solve differential equations by selecting an appropriate inverse transform

• Create, analyze, and interpret a second order differential equation to model a problem involving simple harmonic motion

• Demonstrate an understanding of the concepts of vector space, subspace, linear independence, span, basis, inner products and associated norms

• Solve first and second order differential equations using a variety of methods