**Outcome Assessment Timeline**

**Academic Programs**

**MATHEMATICS AND COMPUTER SCIENCE**

| **APR 4-Year Cycle**  **SLO 3-Year Cycle** | **APR cycle 2022-2025**  **SLO cycle 2020-2022, SLO cycle2023-2025** | **Measure/Collect Data** | **Discuss / Plan** |
| --- | --- | --- | --- |
| **Course ID** | **Course-Level Student Learning Outcome (CSLO)** |
| MATH 100  Mathematics for General Education | Analyze contemporary mathematical problems by applying problem solving techniques using a variety of methods. And then, communicate the results mathematically through a variety of forms. (ISLO 6) | Spring 2022  Spring 2025 | Fall 2022  Fall 2025 |
| Calculate and interpret the probability and odds of everyday events. (ISLO 6) | Spring 2021  Spring 2024 | Fall 2021  Fall 2024 |
| MATH 101  College Algebra | Analyze properties and behavior of functions and implement appropriate techniques to solve applications. (ISLO 6) | Spring 2020  Spring 2023 | Fall 2020  Fall 2023 |
| Use a variety of methods to solve systems of equations and implement those methods to solve application problems. Recognize and graph conic sections. Analyze the behavior of sequences and series. Apply the binomial expansion theorem. (ISLO 6) | Spring 2021  Spring 2024 | Fall 2021  Fall 2024 |
| MATH 104  Trigonometry | Analyze properties and behavior of trigonometric functions and implement appropriate techniques to solve applications. (ISLO 6) | Spring 2020  Spring 2023 | Fall 2020  Fall 2023 |
| Use polar coordinates; represent complex numbers in rectangular and trigonometric forms; perform operations with complex numbers. (ISLO 6) | Spring 2021  Spring 2024 | Fall 2021  Fall 2024 |
| MATH 110  Mathematics for Elementary School Teacher I | Apply different strategies to solve problems - including but not limited to guess and check, sketch pictures and diagrams, look for patterns, work backwards, and solve similar problems. (ISLO 6) | Spring 2020  Spring 2023 | Fall 2020  Fall 2023 |
| Identify and apply the properties and basic operations from the whole number to the rational number system. (ISLO 5) | Spring 2021  Spring 2024 | Fall 2021  Fall 2024 |
| Analyze computational situations to obtain and justify solutions using techniques such as mental arithmetic, estimation, traditional and non-traditional algorithms. (ISLO 5) | Spring 2022  Spring 2025 | Fall 2022  Fall 2025 |
| MATH 111  Mathematics for Elementary School Teachers II | Identify fundamental geometric properties of two- and three-dimensional shapes, including congruency, similarity, and transformations. (ISLO 6) | Spring 2021  Spring 2024 | Fall 2021  Fall 2024 |
| Demonstrate familiarity with basic geometric vocabulary and find values of quantities such as perimeter, area, surface area, volume for certain two and three dimensional shapes. (ISLO 5) | Spring 2020  Spring 2023 | Fall 2020  Fall 2023 |
| Identify and describe different problem solving strategies -- including but not limited to guess and check, pattern identification, working backwards, and solving similar problems - and use them to represent and solve problems in multiple ways. (ISLO 6) | Spring 2022  Spring 2025 | Fall 2022  Fall 2025 |
| MATH 112  Children’s Mathematical Thinking | Read and critique article(s) pertaining to problem solving with whole numbers or fractions. (ISLO 3) | Spring 2020  Spring 2023 | Fall 2020  Fall 2023 |
| Analyze children's understanding of basic arithmetic operations with whole numbers, fractions, and decimals. (ISLO 4) | Spring 2021  Spring 2024 | Fall 2021  Fall 2024 |
| MATH 115  Statway II | Identify, explain and summarize statistical concepts and terminology. (ISLO 2) | Spring 2020  Spring 2023 | Fall 2020  Fall 2023 |
| Understand the logic and reasoning used to interpret results from different types of statistical studies and determine what statistical methods are appropriate in a given situation based on the goal of the analysis, the data available, and the conditions that are met. (ISLO 5) | Spring 2021  Spring 2024 | Fall 2021  Fall 2024 |
| Conduct statistical inference and hypothesis tests and demonstrate the ability to use appropriate statistical evidence to reason about population characteristics and about experimental treatment effects. (ISLO 6) | Spring 2022  Spring 2025 | Fall 2022  Fall 2025 |
| MATH 118  Finite Mathematics | Analyze contemporary mathematical problems by applying problem solving techniques using a variety of methods. And then, communicate the results mathematically through a variety of forms. (ISLO 6) | Spring 2022  Spring 2025 | Fall 2022  Fall 2025 |
| Calculate and interpret the probability and odds of everyday events. (ISLO 6) | Spring 2021  Spring 2024 | Fall 2021  Fall 2024 |
| MATH 119  Elementary Statistics | Identify, explain and summarize statistical concepts and terminology. (ISLO 2) | Spring 2020  Spring 2023 | Fall 2020  Fall 2023 |
| Identify, analyze, and construct formal tests of hypotheses concerning single population means and single population proportions. (ISLO 5) | Spring 2021  Spring 2024 | Fall 2021  Fall 2024 |
| MATH 120  Calculus for Business Analysis | Solve equations and inequalities using algebraic, numerical, and graphical processes, in both mathematical and applied settings, and correctly interpret the results as measured by completion and accuracy of individual tasks graded by teacher-generated rubric. (ISLO 5) | Spring 2020  Spring 2023 | Fall 2020  Fall 2023 |
| Demonstrate knowledge, comprehension, and application of concepts from business calculus including, but not limited to finding maximum and minimum values of a function, and describing the behavior of a function such as the intervals where a function is increasing, decreasing, concave upward and concave downward. (ISLO 6) | Spring 2021  Spring 2024 | Fall 2021  Fall 2024 |
| MATH 121  Applied Calculus I | Apply knowledge of the definitions, properties, and concepts of differential calculus to evaluating derivatives of polynomial, rational, radical, exponential, and logarithmic functions. (ISLO 5) | Spring 2020  Spring 2023 | Fall 2020  Fall 2023 |
| Demonstrate knowledge and the application of concepts of algebra, analytic geometry, and properties and concepts of differential calculus to finding tangent lines, rates of change, velocity, curve sketching, and optimization. (ISLO 6) | Spring 2021  Spring 2024 | Fall 2021  Fall 2024 |
| Apply appropriate critical thinking, analytical reasoning, and concepts of first semester calculus to the solutions of problems in the fields of physical science, social science and biology. (ISLO 5) | Spring 2022  Spring 2025 | Fall 2022  Fall 2025 |
| MATH 122  Applied Calculus II | Demonstrate knowledge and the appropriate application of definitions, rules, and concepts of integral calculus to model and solve problems in the fields of biology, and the physical and social sciences. (ISLO 5) | Spring 2020  Spring 2023 | Fall 2020  Fall 2023 |
| Apply integration techniques to solve problems including areas, volumes, and average value. Define, evaluate and graph trigonometric functions, their derivatives and integrals. (ISLO 6) | Spring 2021  Spring 2024 | Fall 2021  Fall 2024 |
| MATH 130  Introduction to Computer Programming | Write, compile, run, and test simple Java programs using a text editor or an integrated development environment (IDE), such as Eclipse. (ISLO 5) | Spring 2021  Spring 2024 | Fall 2021  Fall 2024 |
| Apply the key principles of object-oriented programming, including abstraction, inheritance, polymorphism, and encapsulation. (ISLO 5) | Spring 2022  Spring 2025 | Fall 2022  Fall 2025 |
| Use conditional logic, loops, and arrays in a Java application. (ISLO 6) | Spring 2020  Spring 2023 | Fall 2020  Fall 2023 |
| MATH 140  Data Structures and Algorithms | Describe problem requirements and employs correct programming constructs and syntax to create a working solution. (ISLO 5) | Spring 2021  Spring 2024 | Fall 2021  Fall 2024 |
| Identify necessary data structures or existing algorithms and use them to solve a problem. (ISLO 8) | Spring 2020  Spring 2023 | Fall 2020  Fall 2023 |
| MATH 230  Computer Organization and Architecture | Use an understanding of computer organization and architecture to structure programs to perform more efficiently. (ISLO 4 | Spring 2020  Spring 2023 | Fall 2020  Fall 2023 |
| Demonstrate how fundamental high-level programming constructs are implemented at the machine-language level. (ISLO 6) | Spring 2021  Spring 2024 | Fall 2021  Fall 2024 |
| MATH 241J  Writing Games with the Java Programming Language | Write, compile, run, and test Java gaming applications using an integrated development environment (IDE) such as Android Studio. (ISLO 5) | Spring 2020  Spring 2023 | Fall 2020  Fall 2023 |
| Use object-oriented programming to write gaming applications. (ISLO 5) | Spring 2021  Spring 2024 | Fall 2021  Fall 2024 |
| Use mathematical algorithms to manipulate images. (ISLO 6) | Spring 2020  Spring 2023 | Fall 2020  Fall 2023 |
| MATH 241M  Mathematics Software Workshop using MATLAB | Model real world situations with and interpret solutions. (ISLO 6) | Spring 2021  Spring 2024 | Fall 2021  Fall 2024 |
| Utilize mathematical resources and technology while demonstrating numerical reasoning and literacy. (ISLO 5) | Spring 2022  Spring 2025 | Fall 2022  Fall 2025 |
| MATH 241P  Python Programming | Use conditional logic, loops, and arrays to analyze data. (ISLO 6) | Spring 2021  Spring 2024 | Fall 2021  Fall 2024 |
| Write, compile, run, and test Python applications using an integrated development environment (IDE) such as Eclipse. (ISLO 5) | Spring 2022  Spring 2025 | Fall 2022  Fall 2025 |
| Use object-oriented programming to model real-world applications. (ISLO 5) | Spring 2020  Spring 2023 | Fall 2020  Fall 2023 |
| MATH 241T  Unit Testing | Write documentation that describes a unit test. (ISLO 2) | Spring 2021  Spring 2024 | Fall 2021  Fall 2024 |
| Write, compile, and run unit tests with an integrated development environment (IDE) JUnit. (ISLO 5) | Spring 2022  Spring 2025 | Fall 2022  Fall 2025 |
| MATH 244  Pre-Calculus with Trigonometry | Use a variety of methods to solve systems of equations and implement those methods to solve application problems. Recognize and graph conic sections. Analyze the behavior of sequences and series. Apply the binomial expansion theorem. (ISLO 6) | Spring 2021  Spring 2024 | Fall 2021  Fall 2024 |
| Analyze properties and behavior of functions and implement appropriate techniques to solve applications. (ISLO 6) | Spring 2020  Spring 2023 | Fall 2020  Fall 2023 |
| Analyze properties and behavior of trigonometric functions and implement appropriate techniques to solve applications. (ISLO 6) | Spring 2020  Spring 2023 | Fall 2020  Fall 2023 |
| Use polar coordinates; represent complex numbers in rectangular and trigonometric forms; perform operations with complex numbers. (ISLO 6) | Spring 2021  Spring 2024 | Fall 2021  Fall 2024 |
| MATH 250  Analytic Geometry and Calculus II | Evaluate limits, derivatives and integrals numerically, graphically and algebraically. (ISLO 6) | Spring 2020  Spring 2023 | Fall 2020  Fall 2023 |
| Use the basic definitions, properties, theorems, and techniques of first semester Calculus to solve problems and applications. (ISLO 6) | Spring 2021  Spring 2024 | Fall 2021  Fall 2024 |
| Analyze and sketch graphs using the principles of calculus. (ISLO 6) | Spring 2022  Spring 2025 | Fall 2022  Fall 2025 |
| MATH 251  Analytic Geometry and Calculus II | Use the basic definitions, properties, theorems, and techniques of second semester Calculus to solve problems and applications. (ISLO 6) | Spring 2020  Spring 2023 | Fall 2020  Fall 2023 |
| Apply Calculus techniques to curves given in polar and parametric form, including graphing, equations of tangent lines, arclength, and area. (ISLO 6) | Spring 2021  Spring 2024 | Fall 2021  Fall 2024 |
| Find and apply power series representations of functions and determine possible errors, radius of convergence, and corresponding derivatives and integrals. (ISLO 6) | Spring 2022  Spring 2025 | Fall 2022  Fall 2025 |
| MATH 252  Analytic Geometry and Calculus III | Use the basic definitions, properties, theorems, and techniques of multivariable Calculus to solve problems and applications. (ISLO 4) | Spring 2020  Spring 2023 | Fall 2020  Fall 2023 |
| Apply vector operations in two and three dimensions and use vector methods to analyze plane and space curves, and curvilinear motion. (ISLO 6) | Spring 2021  Spring 2024 | Fall 2021  Fall 2024 |
| MATH 253  Intro to Differential Equations | Use the basic definitions, properties, theorems, and techniques of Differential Equations to solve problems and applications. (ISLO 4) | Spring 2021  Spring 2024 | Fall 2021  Fall 2024 |
| Apply various methods to solve the vast array of differential equations encountered in Differential Equations. (ISLO 5) | Spring 2020  Spring 2023 | Fall 2020  Fall 2023 |
| MATH 254  Intro to Linear Algebra | Write clear and accurate proofs for some of the results used in the course. (ISLO 2) | Spring 2020  Spring 2023 | Fall 2020  Fall 2023 |
| Use matrices and their operations to solve linear systems and use linear transformations to model real-life problems. (ISLO 5) | Spring 2021  Spring 2024 | Fall 2021  Fall 2024 |
| MATH 260  Discrete Math | Construct mathematical proofs using standard techniques such as induction, contradiction, and contraposition. (ISLO 2) | Spring 2022  Spring 2025 | Fall 2022  Fall 2025 |
| Communicate mathematical ideas and concepts to various audiences. (ISLO 2) | Spring 2021  Spring 2024 | Fall 2021  Fall 2024 |
| Assess the validity of mathematical arguments. (ISLO 5) | Spring 2020  Spring 2023 | Fall 2020  Fall 2023 |
| MATH 265  Discrete Structures | Construct mathematical proofs using standard techniques such as induction, contradiction, and contraposition. (ISLO 2) | Spring 2020  Spring 2023 | Fall 2020  Fall 2023 |
| Communicate mathematical ideas and concepts to various audiences. (ISLO 2) | Spring 2021  Spring 2024 | Fall 2021  Fall 2024 |
| Assess the validity of mathematical arguments. (ISLO 5) | Spring 2022  Spring 2025 | Fall 2022  Fall 2025 |
| MATH 11  High School Math Bridge | Retake the Math Assessment test and place at least two levels above prior placement. (ISLO 6) | Spring 2021  Spring 2024 | Fall 2021  Fall 2024 |
| Score at least 70% on a Math 60 Departmental Final Exam. (ISLO 6) | Spring 2022  Spring 2025 | Fall 2022  Fall 2025 |
| MATH 35  Pre-algebra | Perform calculations with, convert between, solve applications, or compare whole numbers, fractions, decimals and percents without a calculator. (ISLO 6) | Spring 2020  Spring 2023 | Fall 2020  Fall 2023 |
| Set-up and simplify ratios and rates; solve problems involving proportions, conversions or geometric problems involving perimeter, circumference, area and volume; all without a calculator. (ISLO 6) | Spring 2021  Spring 2024 | Fall 2021  Fall 2024 |
| Solve linear equations that contain integers, fractions or decimals; apply exponent rules to simplify exponential expressions; evaluate and perform algebraic operations on polynomials, and solve application problems; all without a calculator. (ISLO 6) | Spring 2022  Spring 2025 | Fall 2022  Fall 2025 |
| MATH 45  Elementary Algebra | Recognize and apply algebraic vocabulary, symbols, and properties, and evaluate and perform operations on algebraic expressions. (ISLO 6) | Spring 2020  Spring 2023 | Fall 2020  Fall 2023 |
| Graph lines and inequalities in two variables and apply to linear models. (ISLO 6) | Spring 2022  Spring 2025 | Fall 2022  Fall 2025 |
| Solve linear equations, quadratic equations and linear inequalities, including applications. (ISLO 6) | Spring 2021  Spring 2024 | Fall 2021  Fall 2024 |
| MATH 48  Developmental Mathematics | Recognize and apply algebraic vocabulary, symbols, and properties, and evaluate and perform operations on algebraic expressions. (ISLO 6) | Spring 2020  Spring 2023 | Fall 2020  Fall 2023 |
| Graph lines in two variables and apply to linear models. (ISLO 6) | Spring 2022  Spring 2025 | Fall 2022  Fall 2025 |
| Solve linear equations, quadratic equations and linear inequalities, including applications. (ISLO 6) | Spring 2021  Spring 2024 | Fall 2021  Fall 2024 |
| MATH 57  Statway I | Identify, explain and summarize statistical concepts and terminology. (ISLO 2) | Spring 2020  Spring 2023 | Fall 2020  Fall 2023 |
| Calculate numerical descriptive statistics, perform correlation and regression analysis, and analyze probabilities to draw conclusions. (ISLO 6) | Spring 2022  Spring 2025 | Fall 2022  Fall 2025 |
| Identify methods for collecting data and create tabular and graphical representations to summarize and present data. (ISLO 5) | Spring 2021  Spring 2024 | Fall 2021  Fall 2024 |
| MATH 60  Intermediate Algebra I | Recognize and apply algebraic vocabulary and definitions, symbols, and properties; evaluate and perform operations on algebraic expressions, and solve equations and inequalities. (ISLO 6) | Spring 2020  Spring 2023 | Fall 2020  Fall 2023 |
| Use algebraic techniques to model and solve applications. (ISLO 6) | Spring 2022  Spring 2025 | Fall 2022  Fall 2025 |
| Graph linear, quadratic and radical functions, and circles. (ISLO 6) | Spring 2021  Spring 2024 | Fall 2021  Fall 2024 |
| MATH 62  Intermediate Algebra II | Demonstrate knowledge and appropriate application of absolute value, polynomial, radical, rational, exponential, inverse, and logarithmic functions. (ISLO 6) | Spring 2021  Spring 2024 | Fall 2021  Fall 2024 |
| Demonstrate knowledge and appropriate application of absolute value, polynomial, radical, rational, exponential, inverse, and logarithmic functions. (ISLO 6) | Spring 2022  Spring 2025 | Fall 2022  Fall 2025 |
| MATH 72  Intermediate Algebra I & II | Demonstrate knowledge and appropriate application of absolute value, polynomial, radical, rational, exponential, inverse, and logarithmic functions. (ISLO 6) | Spring 2020  Spring 2023 | Fall 2020  Fall 2023 |
| Analyze and graph functions and conics using algebraic methods and graphing calculator. (ISLO 6) | Spring 2021  Spring 2024 | Fall 2021  Fall 2024 |
| Recognize mathematical applications in everyday life and apply appropriate critical thinking and algebraic problem solving skills. (ISLO 6) | Spring 2022  Spring 2025 | Fall 2022  Fall 2025 |
| MATH 81  Support for Intermediate Algebra  **\*\*requires concurrent enrollment in M60/M72\*\*** | Students will solve equations, including linear, rational, radical, and quadratic. (ISLO 6) | Spring 2020  Spring 2023 | Fall 2020  Fall 2023 |
| Student will graph functions, including linear, absolute value, and quadratic functions. (ISLO 6) | Spring 2021  Spring 2024 | Fall 2021  Fall 2024 |
| Math 82  Support for Mathematics (General Education)  **\*\*requires concurrent enrollment in M100/M110/M118\*\*** | Use statistical analysis to analyze data and solve problems. (ISLO 5) | Spring 2022  Spring 2025 | Fall 2022  Fall 2025 |
| Solve real-world problems in finance. (ISLO 6) | Spring 2021  Spring 2024 | Fall 2021  Fall 2024 |
| Math 83  Support for College Algebra  **\*\*requires concurrent enrollment in M101\*\*** | Student will graph linear functions, exponential and logarithmic functions, and conic sections, and will use the graphs to solve problems. (ISLO 3) | Spring 2021  Spring 2024 | Fall 2021  Fall 2024 |
| Student will solve linear, absolute value linear, quadratic, rational, exponential and logarithmic equations. (ISLO 6) | Spring 2022  Spring 2025 | Fall 2022  Fall 2025 |
| Math 84  Support for Elementary Statistics  **\*\*requires concurrent enrollment in M119\*\*** | Student will compute probabilities in a variety of situations, and use the results to solve problems. (ISLO 6) | Spring 2021  Spring 2024 | Fall 2021  Fall 2024 |
| Student will use appropriate statistical techniques to analyze data and solve problems. (ISLO 5) | Spring 2022  Spring 2025 | Fall 2022  Fall 2025 |
| Math 85  Support for Applied Calculus  **\*\*requires concurrent enrollment in M120/M121\*\*** | Student will solve applied calculus problems involving rate of change. (ISLO 6) | Spring 2022  Spring 2025 | Fall 2022  Fall 2025 |
| Student will use calculus techniques to determine maximum and minimum values for functions, including applications. (ISLO 6) | Spring 2021  Spring 2024 | Fall 2021  Fall 2024 |
| Math 86  Support for Trigonometry  **\*\*requires concurrent enrollment in M104\*\*** | Analyze properties and behavior of trigonometric functions and implement appropriate techniques to solve applications. (ISLO 6) | Spring 2020  Spring 2023 | Fall 2020  Fall 2023 |
| Use polar coordinates; represent complex numbers in rectangular and trigonometric forms; perform operations with complex numbers. (ISLO 6) | Spring 2021  Spring 2024 | Fall 2021  Fall 2024 |

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| **Program** | **Program-Level Student Learning Outcome (PSLO)** | **Measure/Collect Data** | **Discuss and Plan** |
| Mathematics  01585  Associate in Science Transfer | Use the basic definitions, properties, theorems, and techniques of Calculus. | 2022-2025 | Fall 2022  Fall 2024 |
| Computer Science  01180  Associate in Arts | Recognize and appropriately apply current and historical Software Engineering design patterns, algorithms, and data structures to produce efficient, well-engineered software products. | 2022-2025 | Fall 2022  Fall 2024 |
| Computer Science  01185  Associate in Science Transfer | Recognize and appropriately apply Software Engineering design patterns, algorithms, and data structures to produce efficient, well-engineered software products. | 2022-2025 | Fall 2022  Fall 2024 |