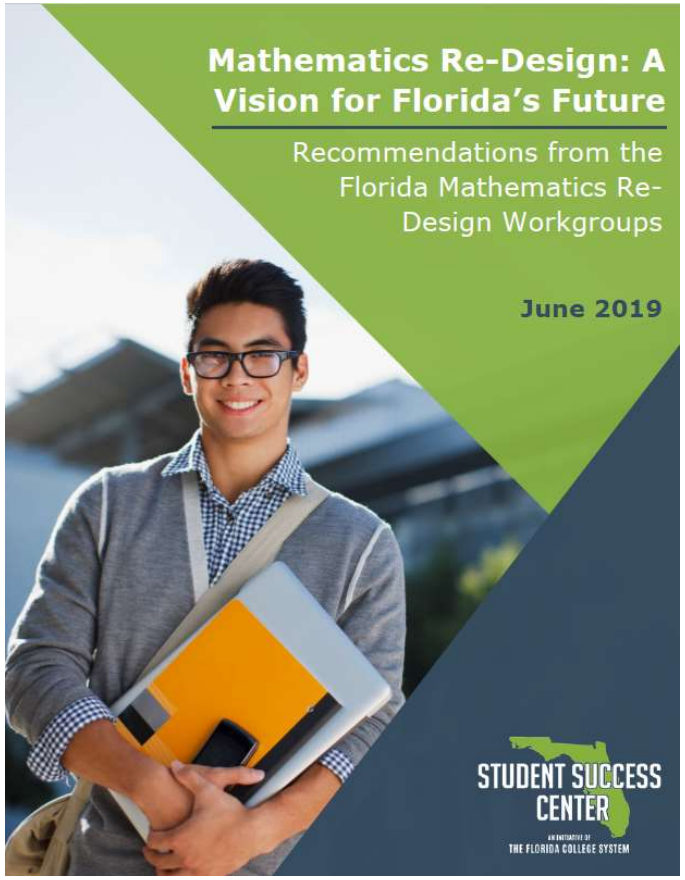
STUDENT SUCCESS CENTER

AN INITIATIVE OF THE FLORIDA COLLEGE SYSTEM

Mathematics Pathways

Florida Mathematics Re-Design Recommendations

- Culmination of the year-long Florida Mathematics Re-Design Initiative
- Includes 11 recommendations for state policy, institutional policy and evidence-based practices designed for scale
- One of the recommendations was to "create common mathematics pathways by aligning mathematics courses to programs, meta-majors and careers in Florida"



Mathematics Pathways Legislation

- The pathways recommendation is reflected in SB 366 from the 2021 legislative session
- The bill states:

  To facilitate seamless transfer of credits, reduce excess credit hours, and ensure students take the courses needed for their future career, the articulation agreement must establish three mathematics pathways for students by aligning mathematics courses to programs, meta-majors, and careers. A representative committee consisting of State University System faculty, faculty of career centers established under s. 1001.44, and Florida College System institution faculty shall collaborate to identify the three mathematics pathways and the mathematics course sequence within each pathway which align to the mathematics skills needed for success in the corresponding academic programs and careers.

Committee Details

- Members of the committee began collaborating in fall 2021 to identify the three mathematics pathways and corresponding course sequences.
- The committee is composed of:
  - 8 members representing the State University System (SUS)
  - 8 members representing the Florida College System (FCS)
  - 2 members representing the school district career centers
  - 1 non-voting member who serves on the Articulation Coordinating Committee - Dr. Kathleen Ciez-Volz

Going into the work…

- Florida has identified general education core mathematics courses.
  - MAC X105 College Algebra; MAC X311 Calculus I; MGF X106 Liberal Arts Mathematics I; MGF X107 Liberal Arts Mathematics II; STA X023 Statistical Methods.
- In total, there are currently 765 courses in the mathematics discipline in the Statewide Course Numbering System.
- Additionally, there is no statewide commonality for course-level prerequisites.

Committee's Approach: Skills vs. Courses

- To address the ambiguity about mathematical knowledge, the committee adopted a program-level assessment to determine exactly which mathematical ***skills*** **–** opposed to ***courses*** **–** students need to be exposed to and master in order to be successful in the degree.
- The survey was disseminated to discipline experts at Florida College System and State University System institutions
- Survey responses informed the foundation of the proposed mathematics pathways

Scope of Statewide Pathways

Associate in Science/Applied Science

General Education (Gen Ed) Core Course in Pathway

(1 course from pre-defined course numbers in Gen Ed Core rule)

Associate in Arts

Gen Ed Core Course in Pathway

(1 course from pre-defined course numbers in Gen Ed rule)

Institutional Course

(Meets common learning outcomes and is aligned with CPM; Course numbers are recommended, but institutions have flexibility in deviating if SLOs are met)

Bachelor's

Gen Ed Core Course in Pathway

(1 course from pre-defined course numbers in Gen Ed rule)

Institutional Course

(Meets common learning outcomes and is aligned with CPM; Course numbers are recommended, but institutions have flexibility in deviating if SLOs are met)

Proposed Pathways

- Algebra through Calculus
- Statistical Reasoning
- Mathematical Thinking in Context

Algebra through Calculus

- **Pathway Description:** This pathway is intended for students whose academic program requires a foundation of algebra, followed by a sequence of courses that may lead to calculus.

- **Learning Outcomes:**
  - Demonstrate the knowledge of various algebraic relationships and their application.
  - Employ computational techniques to mathematical problem solving.
  - Execute appropriate mathematical modeling techniques for solving application problems and interpret results of solutions.
  - Develop graphical models using algebraic and problem-solving techniques.
  - Articulate a working knowledge of various functions and their application, as appropriate.

- **General Education Core Course:** MAC X105 College Algebra

Statistical Reasoning

- **Pathway Description:** Statistics is inherently a data-based discipline that requires students to recognize variability in data and to take it into account to make decisions in a way that acknowledges and quantifies uncertainty. Students in the statistical reasoning pathway will gain a statistical knowledge foundation in areas such as descriptive statistics, probability, and inferential statistics that will allow them to use and interpret data.
- **Learning Outcomes:**
  - Students will analyze data using graphical and numerical methods to study patterns and departures from patterns, using appropriate technology as needed.
  - Students will critically evaluate a data-collection plan to answer a given research question.
  - Students will use probability concepts and simulation.
  - Students will use statistical models to draw conclusions from data.
  - Students will perform correlation and regression analyses.
  - Students will apply statistical reasoning and data analysis to real-world or major-specific examples.
- **General Education Core Course:** STA X023 Statistical Methods I

Mathematical Thinking in Context

- **Pathway Description:** This pathway recognizes mathematics as a characteristically human endeavor, and is intended for students in the broadest range of programs of study. In this pathway, students will explore a variety of mathematical concepts utilizing multiple ways of thinking to formulate and solve problems in context.
- **Learning Outcomes:**
  - Determine efficient means of solving a problem through investigation of multiple mathematical models.
  - Apply logic in contextual situations to formulate and determine the validity of logical statements using a variety of methods.
  - Apply mathematical concepts visually and contextually to represent, interpret and reason about geometric figures.
  - Apply mathematical models to civically contextual situations (e.g., stocks, finance, voting, population dynamics, etc.).
  - Recognize the characteristics of numbers and utilize numbers along with their operations appropriately in context.
  - Organize, visualize and model data in a meaningful way.
  - Analyze and interpret representations of data to draw reasonable conclusions.
  - Engage in ways of thinking that may involve sample size, counting strategies, chance, ratios and proportions.
- **General Education Core Course:** Mathematical Thinking (new course)

Proposed New Courses

- **Course Titles:**
  - Mathematical Thinking
  - Mathematics in Context
- **Learning Outcomes:**
  - Determine efficient means of solving a problem through investigation of multiple mathematical models.
  - Apply logic in contextual situations to formulate and determine the validity of logical statements using a variety of methods.
  - Apply mathematical concepts visually and contextually to represent, interpret and reason about geometric figures.
  - Recognize the characteristics of numbers and utilize numbers along with their operations appropriately in context.
  - Analyze and interpret representations of data to draw reasonable conclusions.
  - Apply mathematical models to civically contextual situations (e.g., stocks, finance, voting, population dynamics, etc.).
  - Organize, visualize and model data in a meaningful way.
  - Engage in ways of thinking that may involve sample size, counting strategies, chance, ratios and proportions.

Timeline

Activity	Expected Timeline
ACC approved proposed mathematics pathways and course sequences	July 21, 2022
Florida Department of Education (FDOE) initiates rule development process/Office of the Board of Governors (BOG) initiates regulation development process to incorporate math pathways	July 2022
State Board of Education/Florida Board of Governors considers mathematics pathways rule/regulation revisions	January 2022
FDOE/BOG notify institutions and provide technical assistance	January 2022 (T.A. ongoing)
State and institutional curriculum processes (curriculum committees, curriculum frameworks, catalog updates, staff training, etc.)	2023-24 academic year
Mathematics pathways effective for entering students in associate and baccalaureate degree programs	2024-25 academic year