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## Corequisite Mathematics Toolkit

# Design Principles

A crucial step in ensuring that the scaling of corequisite supports maximize student learning and achieve equitable outcomes is to capture and communicate effective practices for designing, delivering and continuously improving corequisite math to faculty, instructional designers, faculty developers, college administrators, system leaders and policymakers. These principles are designed to guide this process.

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**Supported by:** Strong Start to Finish and Education Commission of the States



Every student deserves a strong start in their first year of college. This toolkit is part of a SSTF three-part series, providing resources to assist postsecondary leaders design and implement reform strategies that support equitable outcomes for students who are marginalized and racially minoritized.



# Principles for the Design and Delivery of Corequisite Mathematics Supports

A crucial step in ensuring that the scaling of corequisite supports maximizes student learning and achieves equitable outcomes is to capture and communicate effective practices for designing, delivering and continuously improving corequisite math to faculty, instructional designers, faculty developers, college administrators, system leaders and policymakers. What follows below is a list of principles for design and delivery of corequisite supports from the design process and elements to enrollment practices and success frameworks.

## Principle 1. Corequisite mathematics objective

The objective of a corequisite math program is to ensure that each student:

- 1.1** Enrolls in the college-level math course aligned to their chosen program of study.
- 1.2** Is assessed using evidence-based measures to determine their need for additional academic support.
- 1.3** Receives those supports through just-in-time corequisite supports.
- 1.4** Completes the gateway math course with the relevant skills and knowledge essential to success in their program of study.

The implementation of math pathways with corequisite supports is a component of comprehensive institutional policies and practices designed to result in students participating equitably and successfully in all programs of study. There is special attention to programs that provide opportunities for upward economic mobility and income equality.

## Principle 2. Corequisite mathematics course design process

*(Aligns to Core Principle #4)*

Institutions that successfully implement a corequisite math course:

- 2.1 Identify and dismantle policy and practice barriers that deny students access to college-level math courses and result in inequitable student outcomes. Dismantling such policies and practices will ensure that each student has equal access to, and successfully engages in, high-quality college-level math courses in their first term.
- 2.2 Establish processes for implementing, assessing, improving and scaling corequisite courses that involve key institutional stakeholders, including administrators, faculty, instructional designers, advisors, student support services, financial aid professionals and registrars.
- 2.3 Understand the postsecondary experiences of students, use this understanding in design decisions, and pay particular attention to the impact of design decisions on racially minoritized communities.
- 2.4 Implement corequisite models that will most effectively achieve equitable access and success for each student, and that will be sustainable within their institutional context.

### Principle 3. Corequisite mathematics course design elements

*(Aligns to Core Principle #4)*

Essential elements of effective corequisite math courses include:

- 3.1 Enrollment of students in the college-level math course aligned to their chosen program paths.
- 3.2 Sections of the college-level course with corequisite supports that are identical in content and outcomes to those available to students in non-corequisite sections.
- 3.3 Content in the corequisite supports course that is explicitly aligned and organized to support student learning and success in the college-level course, and prepares the student to transfer the learning into future courses in their programs of study.
- 3.4 Support content that is provided in a single term side-by-side or embedded within the college-level course, not as a precursor to the college-level content.
- 3.5 Strategies to boost academic confidence, sense of social belonging, and understanding of the relevance of the math concepts, and to achieve academic, career and personal goals.
- 3.6 Policy stating that successfully completing the college-level course, regardless of the grade in the corequisite supports course, is the only requirement for students to earn college-level credit and move on to subsequent courses in the math pathway and/or program of study aligned to the gateway course.
- 3.7 Consistent instructional practice across the college-level math course and corequisite supports course that supports each learner's need in order to achieve equitable outcomes for students, regardless of race, income, age, gender or other minoritized status.

Design elements of other corequisite math courses depend upon the needs of the student population and institutional context. Institutional teams examine available research on effective practices along with local data to make decisions on:

- 3.8 Assigning a single instructor or different instructors for the college-level course and corequisite course.
- 3.9 Determining the number of credit hours for the corequisite sections.

- 3.10** Co-enrolling corequisite students in college-level sections with students who do not require corequisite supports, or offering college-level sections for corequisite students only.
- 3.11** Scheduling corequisite sections relative to the college-level course (e.g., alternating days or same day as college-level, just before college-level, immediately following college-level).

#### **Principle 4. Course enrollment practices**

*(Aligns to Core Principles #1 and #2)*

Institutions that successfully deliver the instruction students need to achieve their academic goals:

- 4.1** Identify and enroll all students in the gateway math course consistent with their academic goals and chosen programs of study, regardless of any assessment of their preparation levels for that course.
- 4.2** Assess students to ensure instruction and academic support will maximize their success in the college-level math course, not determine access to the college-level course.
- 4.3** Assess the need for support through the use of multiple evidence-based measures to include, but not be limited to, high school GPA and high school performance in mathematics.
- 4.4** Make corequisite supports mandatory for students when the evidence-based measures referenced above show corequisite supports will increase the likelihood that they will pass the college-level course.

#### **Principle 5. Integration with a comprehensive student success framework**

*(Aligns to Core Principles #3 and #5)*

Institutions that implement comprehensive student success frameworks:

- 5.1** Align math pathways to other institutional pathways initiatives.
- 5.2** Include corequisite math support as an essential strategy for increasing the likelihood that students achieve critical first-year momentum metrics to include completion of gateway math and English, earning 30 credits and enrolling into and earning at least nine credits in a program of study in their first academic year.
- 5.3** Design math courses and corequisite supports to meet the specific needs of their student populations, including understanding and addressing how policies and practices impact sub-populations differently.

#### **Principle 6. Continuous improvement**

*(Aligns to Core Principles #6 and #7)*

Institutions that deliver an equitable, high-quality learning experience that maximizes the success of each student:

- 6.1** Collect, analyze and act upon disaggregated quantitative and qualitative data that measure the impact of course design, course content, instructional strategies, placement policies and other relevant institutional or state policies on the success of students by race, ethnicity, income level, gender, age or other minoritized status.

- 6.2 Collect qualitative data that capture the experiences of students and faculty, and examine the messaging students receive about math pathways, corequisite courses and other types of supports.
- 6.3 Establish clear measures of success that include the numbers and percentages of students completing a college-level math course, and establish mid- and long-term measures, such as retention, success in subsequent courses and completion of a certificate or degree.
- 6.4 Use data to inform a continuous improvement process to refine both the college-level course and corequisite supports and related practices, including placement and advising.
- 6.5 Use data to identify, understand and address the needs of students who are less well-served by the corequisite supports.
- 6.6 Explicitly identify, understand and address factors that either contribute to or detract from the success of students from minoritized communities in college-level mathematics courses.

### Principle 7. Policy

*(Aligns to Core Principles #1 and #2)*

States, systems and institutions that successfully scale corequisite supports:

- 7.1 Adopt policies that create the enabling conditions for each student to enter directly into and succeed in a gateway mathematics course aligned to their goals.
- 7.2 Involve institutional leaders and faculty in the development and design of, and advocacy for, policies to support the implementation of math corequisites.
- 7.3 Design policies and provide resources to ensure that corequisite math courses are accessible to all students who are assessed as needing additional academic support, and address structural and systemic inequities present in entry-level mathematics programs.

### Principle 8. Professional development and support of stakeholders

*(Aligns to Core Principle #3)*

Institutions that successfully implement and scale corequisite math and design professional development and other supports that:

- 8.1 Build the capacity of faculty to design, deliver and continuously improve corequisite math at their institutions with supports that meet their needs at different stages of the implementation process.
- 8.2 Facilitate collaboration among diverse stakeholders, including institutional researchers, administrators and student support professionals.
- 8.3 Result in the deployment of inclusive pedagogies and practices that maximize the success of students from minoritized communities.
- 8.4 Enable faculty, advisors and student services staff to maintain and build the academic mindset of students.
- 8.5 Inform faculty, advisors and student services staff on how students can access additional social supports.
- 8.6 Sustain support and engagement of all institutional stakeholders responsible for the successful implementation of corequisite math. In particular, advisors receive support on equitable practices when advising for math pathways.

## Reform Phases

Carrying out a reform initiative is a cyclical process that includes phases such as getting started, planning for action, implementing the plan, and engaging in continuous improvement by analyzing results and moving through the cycle again. Read more about each of these steps in the [Dana Center Mathematics Pathways \(DCMP\) Implementation Guide for math pathways](#).



# About This Toolkit

The development of this toolkit was guided by the advice of a national advisory panel made up of experts who have worked deeply with corequisites across a variety of roles and contexts. The panel includes researchers, policymakers, faculty members, equity advocates and curriculum experts who collectively articulated a consensus statement on the foundational core of this toolkit, the “Corequisite Design Principles” document and vetted the associated resources.

## About The Authors

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Connie leads the curriculum development team for the Dana Center Mathematics Pathways, a transformative redesign to modernize entry-level college mathematics programs through working with states, systems, universities and colleges. She also supports the development of DCMP’s professional learning offerings related to curricular redesign, corequisite supports and pedagogy. In this work, Connie collaborates with faculty to identify best practices and disseminate to the field.

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## About The Charles A. Dana Center

The Dana Center works to dismantle barriers in education systems to ensure all students—especially those who have historically been underserved—have equitable access to and success in an excellent math and science education. Our higher education work focuses on strategies and tools that support faculty and institutions in creating more seamless transitions from high school to and through gateway mathematics courses.

## About Strong Start to Finish

Strong Start to Finish is a network of policy and research partners, institution and systems leaders, and foundations advancing system reforms in developmental education, so every student can succeed in their first year of college. In particular, we support college success for Black, Brown, Asian American, Indigenous students, adult learners, and students with low incomes, who have been underserved by the education system for too long. We work to scale the use of proven, proactive strategies that remove barriers that typically impede these students from earning essential college credits in English and Math courses in their first year. Education Commission of the States is the host of the Strong Start to Finish network.



### Acknowledgements

The authors would like to thank Strong Start to Finish (SSTF) who provided funding to support the Charles A. Dana Center's efforts to scale last mile work in implementing reform that supports students in completing their credit-bearing math and English courses within their first year of college.



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