California Community Colleges

MEMORANDUM
February 27, 2024

ESLEI 24-15 | Via Email

TO: Chief Executive Officers
Chief Instructional Officers
Chief Student Services Officers
Chief Business Officers
Academic Senate Presidents
Articulation Officers
Curriculum Chairs
Admissions and Registrars Professionals
Institutional Research, Planning, and Effectiveness Professionals

FROM: Aisha N. Lowe, Ph.D., Executive Vice Chancellor
Office of Equitable Student Learning, Experience, and Impact (ESLEI)

RE: Required Action:
AB 1705 Validation of Equitable Placement, Support and Completion Practices for STEM Programs

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Vision 2030: A Roadmap for California Community Colleges prioritizes data-based, student-centered strategies and includes added emphasis on equitably strengthening access, support, and success in STEM. Achieving those goals and strengthening the STEM pathways across California community colleges requires effective implementation of Assembly Bill 1705 which requires math placement, initial math enrollment, and academic support to be data-driven in its design with the goal of producing strong and equitable completion of gateway calculus requirements for STEM programs.

These requirements were detailed in the AB 1705 guidance memo (December 2022) and in the AB 1705 Implementation Guide (March 2023). Subsequent guidance was disseminated for the validation of general education and non-STEM transfer-level placement and enrollment practices (May 2023), which included the certification of local implementation.

This guidance memorandum provides additional direction on the validation process for transfer-level math placement and enrollment practices for STEM programs (described for Required Action 2 in previous memos, and described in Education Code §78213, subsections (f) and (i)).

This guidance memorandum addresses:

- A description of the certification and validation options and process for math placement and enrollment into STEM Calculus pathways for STEM programs, with a summary of relevant state and local research.
- **Required action** to submit an A*B 1705 Validation of Equitable Placement, Support, and Completion Practices for STEM Programs* certification.

Expanding STEM Pathways for the STEM Workforce

The California Community Colleges are to be commended for the herculean breadth and depth of work that has been accomplished over the past six years to expand students' access to essential gateway and preparatory courses. This work has not been easy, but you have risen to the challenge to reimagine course sequences, course content, as well as academic, social-emotional, and basic needs supports for our students. Your work is to be applauded and congratulated. Thank you.

As you implement this final phase of AB 1705 focused on STEM, please do so with the true goals in mind – expanding access to STEM so we can fuel the STEM workforce and prepare our students for the jobs of the future. You are the peoples' college, and it is this system that will lead workforce and economic development across the state. As we complete this final AB 1705 validation, please know the Chancellor's Office has and will continue to invest significant resources in supporting your work and your college. The flexibility being provided here to innovate a STEM calculus 1 preparatory course is a part of that support. Additionally, the Chancellor's Office is working with intra-segmental and intersegmental partners to design ways to support colleges in designing innovative courses and a timeline that allows for general education approval (more details to come).

Please join the Chancellor's Office on March 4th for a webinar to further discuss the details of this guidance and address your questions (see webinar details and registration link in Appendix A.)

Validation of STEM Calculus Pathway Placement and Initial Math Enrollment

Education Code §78213 (i) mandates that students begin in transfer-level English and math coursework that satisfies a requirement for their certificate, degree or transfer program with exceptions as described in §78213 (j) and a deadline of July 1, 2023. Education Code also allows, in §78213 (f)(1), an extension to STEM programs of July 1, 2024, for local validation of preparatory coursework that would satisfy the exception described in §78213 (j)(8). If preparatory coursework is not validated, colleges may not require or recommend the courses as of July 1, 2025, as stated in §78213 (f)(2). The guidance in this memorandum adheres to the legislatively set timelines for STEM programs in §78213 (f) while affording a period of data-driven innovation as colleges move toward achieving full compliance with Education Code §78213 (i) for STEM programs.

AB 1705 specifies that colleges must demonstrate the benefit of transfer-level math preparatory courses for STEM Calculus 1 based on the following conditions:

- The student is highly unlikely to succeed in the first STEM calculus course without the additional transfer-level preparation.
- The enrollment will improve the student's probability of completing the first STEM calculus course.
- The enrollment will improve the student's persistence to and completion of the second calculus course in the STEM program, if a second calculus course is required.

From now until July 1, 2024, colleges have the opportunity to validate that their preparatory courses meet the aforementioned AB 1705 standards. To support colleges in their validation efforts, the Chancellor's Office, in collaboration with the RP Group's Multiple Measures Assessment Project team, conducted an extensive statewide analysis and a local analysis for each college, to assess:

1. Which students are highly unlikely to succeed when enrolled directly in the first STEM calculus course?
2. Which students are more likely to complete STEM Calculus 1 when they start in a transfer-level preparatory course?
3. Which students are more likely to persist to and complete STEM Calculus 2 when they start in a transfer-level preparatory course before STEM Calculus 1?

These questions were investigated by examining the progress of community college STEM students whose first math enrollment was a transfer-level math course in the calculus pathway (e.g., College Algebra, Trigonometry, Precalculus or STEM Calculus 1). The analysis calculated completion rates (also known as throughput) which include all STEM students who began in the calculus pathway, not just those who eventually enrolled in calculus. Students were followed for two years to allow a full examination of multi-course preparatory sequences leading to calculus. The results of those analyses are summarized below.

Statewide and College Research Analysis Results

Highlights from statewide analyses:

In the statewide analysis (linked here) STEM students were disaggregated by high school math preparation to identify students who might benefit from college coursework prior to enrolling in calculus. An additional analysis disaggregated students by the default STEM placement rules, which were developed in 2018 for placement into precalculus.

The analysis found the following:

- Based on high school math preparation or placement levels in the default STEM placement rules for precalculus, no group was highly unlikely to succeed in STEM Calculus

1 when directly enrolled and given two years. Across all levels of high school math preparation and across the placement levels, students who started math in STEM Calculus 1 successfully completed it at rates exceeding 50% within the two-year timeframe.

- Across all levels of high school math preparation and placement, preparatory college coursework was associated with lower STEM Calculus 1 throughput relative to direct enrollment into calculus, even after regression adjustments that controlled for factors such as time elapsed between high school and college math enrollment, prior use of placement testing, student demographics and institutional characteristics.
- Across all levels of high school math preparation and placement, longer preparatory course sequences were associated with higher rates of attrition and lower STEM Calculus 1 throughput in a two-year timeframe.
- Across all levels of high school math preparation and placement, students completed the second STEM Calculus course at higher rates within three years if they began in STEM Calculus 1 rather than a preparatory course prior to Calculus 1.
- Attrition in the path to STEM Calculus may contribute to attrition in STEM and to the loss of STEM potential. Over 68% of STEM students who start in a transfer-level preparatory course in the calculus pathway do not attempt calculus within two years, which severely hampers their progress in STEM.
- Pathways to STEM Calculus and inequitable access to Calculus may contribute to inequity in calculus completion and ultimately to less diverse STEM programs.

Highlights from the college-level analyses:

Each college will receive with this memorandum a report based on their local data that addresses the same three questions investigated in the statewide analysis. The local reports use the most recent cohorts that allow for a two-year Calculus 1 throughput calculation (2019-2020, 2020-2021, and Fall 2021). The local reports will help colleges decide their next steps in the process to achieve compliance with AB 1705. Colleges may choose to follow the findings in their local report and forgo data submission.

For the local analyses, we defined a Lowest STEM Placement group to identify a set of students who might achieve higher calculus completion rates if they begin in preparatory coursework prior to calculus. The Lowest Placement Group is students with a high school GPA equal to or less than 2.6 (HSGPA<=2.6) or students who had not previously earned a C or better in high school trigonometry, precalculus, or calculus.

Across the 115 local college analyses, we found that local results mirrored the statewide results:

- At no college were the Lowest STEM Placement students highly unlikely to succeed with direct enrollment into STEM Calculus 1 (using a throughput of 15% as the definition of “highly unlikely”).
- At the majority of colleges (106 colleges),
    - Some Lowest STEM Placement students are beginning directly in STEM Calculus 1,

where their median completion rate was 64% within a two-year timeframe.
    - Lowest STEM Placement students were more likely to complete the first STEM calculus course within two years if they started in calculus instead of starting in a preparatory course (with completion gains from 11%-92%).
- At 112 colleges, fewer than half of the Lowest STEM Placement students who started in any of the offered preparatory courses completed the first STEM calculus course within two years (completion rates were below 25% at 62 colleges).
- Across all colleges, the two-year STEM Calculus 1 completion for Lowest STEM Placement students was the worst for students who started in a two- or three-course pathway. Lowest STEM Placement students who began in the last course in the pathway had higher throughput than students starting in the first course.

This research provides consistent evidence, both at the state and local level, that transfer-level preparatory courses do not meet AB 1705 standards. At present, high rates of attrition in pathways to calculus are a bottleneck for STEM programs and efforts to improve STEM participation and STEM equity hinge on addressing this issue.

STEM Calculus Pathway Placement Rules

The following STEM Calculus Pathway Placement Rules operationalize this research and provide the next steps toward achieving AB 1705 compliance according to legislatively set deadlines, while also allowing colleges flexibility in transitioning to new curricular models of learning support for STEM calculus. The STEM Calculus Pathway Placement Rules are summarized in the table below.

These placement rules pertain only to students who require STEM Calculus 1 for their program or major. STEM students who need applied calculus for their major should begin in that course per previous AB 1705 validation efforts (Education Code §78213 (e)). STEM students who also need Statistics for their program or major may begin in that course, but when they start on the STEM Calculus Pathway, the following rules apply.

STEM Calculus Pathway Placement	Placement and Enrollment in the STEM Calculus Pathway for STEM Students in Majors that Require STEM Calculus 1
For All Students	• By July 1, 2025, all students pursuing STEM programs ***must be given access to STEM calculus*** (with or without concurrent support). Students cannot be denied access to STEM Calculus 1 after July 1, 2025, unless the college has full validation status, as defined below. • As of July 1, 2025, concurrent support in the form of a corequisite or an enhanced STEM Calculus 1 course, of no more than two additional units, ***must be available as an***

	option but can only be required for Lowest Placement students (defined below).
Higher STEM Placement HS GPA > 2.6 AND Passed high school Trigonometry, Precalculus, or Calculus with a C or better	At all colleges, the placement and initial enrollment for STEM students in the higher STEM placement band is STEM Calculus 1. Low unit (2 or fewer units) corequisite course or enhancement to STEM Calculus 1 may be recommended to students but not required.
Lowest STEM Placement HS GPA <= 2.6 OR Did not pass high school Trigonometry, Precalculus, or Calculus with a C or better	At all colleges, except those with full validation status, students in the Lowest STEM placement band must be given the option to begin in one of the following: (1) STEM Calculus 1 (2) STEM Calculus 1 with 2 or fewer units of attached support (3) An optional preparatory course with interim approval (Option C below) or an innovative preparatory course (see Option D below), but not both. At colleges with full validation status, students in the Lowest STEM placement band can be placed and enrolled into the validated preparatory course(s).

Required Action: Certification of Progress Toward AB 1705 Validation for STEM Calculus Pathway Placement and Initial Math Enrollment

In accordance with these findings and to adhere to the legislatively set timeline of July 1, 2024, **all colleges must submit an AB 1705 STEM Calculus Pathway Certification Form by July 1, 2024**. Colleges will report their compliance status and plans by choosing one of the four options below. The certification form provides colleges with the opportunity to submit local data, through the AB 1705 STEM Calculus Pathway Data Validation Template (included in the certification form). Each college will receive an individualized email (sent to college leadership) with the college's local analysis results and a unique link to the certification form.

All colleges have the opportunity to submit data through the STEM Calculus Pathway Data Validation Template to achieve (1) full AB 1705 validation status for their current STEM Calculus

pathway placement and enrollment practices or (2) apply for interim approval of an existing transfer-level preparatory course as described below. If colleges choose to forgo data submission, there is still an option for preparatory course innovation as described below.

Option A (**STEM Calculus 1 Implementation**): Colleges choosing this option are meeting AB 1705 standards by replacing stand-alone preparatory courses with support-enhanced STEM Calculus 1 or linked corequisite support of no more than two additional units by July 1, 2025. If the college continues to offer stand-alone preparatory courses, enrollment will be proactively restricted to student populations described in §78213 (j). These colleges will still complete the certification form, but no data submission is required.

Option B (**Apply for Validation Approval**): Colleges choosing this option are applying for full AB 1705 STEM Calculus Pathway Validation by validating an existing preparatory course or courses in the college's STEM Calculus pathway. This option requires local data to meet the three standards in §78213(f)(1) for the Lowest STEM Placement group. If the analysis provided by the Chancellor's Office in the college's report already provided this validation, please select Option B in the certification form, but do not submit data. If the CO analysis did not already award validation status to the college, the college must submit data by July 1, 2024. If validation approval is granted, colleges will implement the STEM Calculus Pathway Placement rules with the validated course or courses required for Lowest STEM Placement students by July 1, 2025.

Option C (**Apply for Interim Approval**): Colleges choosing this option are applying for interim approval of an existing preparatory course or courses in the college's STEM Calculus pathway that does not meet all 3 standards of the law §78213(f)(1). This option requires local data to demonstrate STEM Calculus 1 throughput in two years is 50% or greater for Lowest Placement Students starting in the course. If the analysis provided by the Chancellor's Office in the college's report already provided this approval, please select Option C in the certification form, but do not submit data. If the CO analysis did not already award interim approval to the candidate course, the college must submit data by July 1, 2024. If interim approval is granted, colleges choosing this option will implement the STEM Calculus Pathway Placement rules with the interim course option for Lowest STEM Placement students (see the placement rules table above). Interim courses will undergo additional validation by July 1, 2027, and must achieve full validation status in order to continue as a placement and enrollment option beyond July 1, 2027 (i.e., the course will need to meet all three standards described §78213(f)(1)).

Option D (Implement an Innovative Course): Colleges choosing this option are planning to enact the STEM Calculus Pathway Placement rules with the innovative preparatory course option for Lowest STEM Placement students. An innovative preparatory course is no more than 4-units with no more than 2-units of concurrent support. This course will be offered during the two-year innovation period (Fall 2025-Spring 2027). An innovative course will undergo additional validation by July 1, 2027, and must achieve full validation status in order to continue as a placement and

enrollment option beyond July 1, 2027 (i.e., the course will need to meet all three standards described in §78213(f)(1)). No data submission is required.

Colleges should closely coordinate and ensure **only one form per college** is electronically submitted to the Chancellor's Office (using the college's unique link to the form which will be emailed to college leadership). Multiple submissions from the same college will not be processed, resulting in non-compliance.

Certification Attachments and Other Resources

- Webinar details and registration in Appendix A. below
- Preparatory Pathways and STEM Calculus Completion Report
- Copy of certification submission form (for reference only) in Appendix B. below
- Preparatory Pathways and STEM Calculus Completion: Implications of the AB 1705 Standards, Technical Appendices (will be available later this week)
- AB 1705 Guidance Memo (December 2022)
- AB 1705 Implementation Guide (March 2023)
- AB 1705 FAQ

Chancellor's Office Program Contacts

Please direct inquiries regarding this guidance to the Chancellor's Office Educational Services and Support Division at AB705@cccco.edu.

cc: Dr. Sonya Christian, Chancellor
Dr. Daisy Gonzales, Deputy Chancellor
Dr. John Hetts, Executive Vice Chancellor, Innovation, Data, Evidence, and Analytics (IDEA) Office
Dr. John Stanskas, Vice Chancellor, Office of Equitable Student Learning, Experience, and Impact
All Chancellor's Office Staff

Appendix A: Webinar Details

AB 1705 Equitable Placement, Support and Completion STEM Validation of Practices Webinar
Monday, March 4, 2024
3:00 p.m. - 5:00 p.m.

As CCCs are implementing Equitable Placement, Support and Completion (AB 1705), join the Chancellor's Office and researchers from the RP Group/MMAP as we present the STEM validation of practices, to include a data presentation, an overview of the Chancellor's Office guidance memorandum, guidance on the interpretation of college-specific reports, and an overview of the data submission template and certification process, followed by a live Q&A session.

Please click this Zoom registration link below to register in advance for the webinar (https://foundationccc-org.zoom.us/webinar/register/WN_PQpgAb3yS4ul19I0iC79OA#/registration).

Appendix B: Certification Submission Form

A copy of the certification form each college will complete is reproduced here **for reference purposes only**. Each college will complete one certification form online using **a unique link** provided to college leadership.

Equitable Placement and Completion:

AB 1705 STEM Calculus Pathway Certification Form

BACKGROUND AND INSTRUCTIONS

College Contact Information

CERTIFICATION

By July 1, 2024, submit this form to communicate with the Chancellor's Office your college's plans for working toward AB 1705 implementation for STEM programs. Select one of the following options that describes your college's plans.

Option A (Full Compliance): By July 1, 2025, the college will place and ensure the enrollment of all students with STEM intent into STEM Calculus 1 with appropriate support (required or recommended) as described in the STEM Calculus Pathway Placement Rules. This includes the replacement of stand-alone preparatory courses with low unit (2 or fewer additional units) support-enhanced STEM Calculus 1 or attached low unit (2 or fewer units) corequisite support. If the college continues to offer stand-alone preparatory courses, enrollment will be actively restricted to student populations described in §78213 (j).
Data submission is not required.

Option B1 (Apply for Validation Approval with Data Submission): Colleges choosing this option are applying for full AB 1705 STEM Calculus Pathway Validation by validating one or more existing preparatory courses in the college's STEM Calculus pathway. This option requires local data to meet the three standards in §78213(f)(1) for the Lowest STEM Placement group. If validation approval is granted, colleges will implement the STEM Calculus Pathway Placement rules with the validated course or courses as a requirement for Lowest STEM Placement students by July 1, 2025.

A completed Data Validation Template form is required for colleges seeking approval based on local data submissions. You will be prompted to upload your data template in the next window.

Option B2 (Apply for Validation Approval Based on the College-Specific Report Provided by the CO): Colleges choosing this option are applying for full AB 1705 STEM Calculus Pathway Validation by validating one or more existing preparatory courses in the college's STEM Calculus pathway. This

option requires local data to meet the three standards in §78213(f)(1) for the Lowest STEM Placement group. If validation approval is granted, colleges will implement the STEM Calculus Pathway Placement rules with the validated course or courses as a requirement for Lowest STEM Placement students by July 1, 2025.

For Option B2, the college-specific report provided by the CO already indicates validation approval for the college. No data submission is required.

Option C1 (Apply for Interim Approval with Data Submission): Colleges choosing this option are applying for interim approval of one or more existing preparatory courses in the college's STEM Calculus pathway. Preparatory courses with interim approval do not meet all three standards of §78213(f)(1) but have a two-year STEM Calculus 1 throughput greater than 50% for Lowest STEM Placement students. If interim approval is granted, colleges will implement the STEM Calculus Pathway Placement rules with the interim course or courses as an option for Lowest STEM Placement students by July 1, 2025.

A completed Data Validation Template form is required for colleges seeking interim approval based on local data submissions. You will be prompted to upload your data template in the next window.

Option C2 (Apply for Interim Approval Based on the College-Specific Report Provided by the CO): Colleges choosing this option are applying for interim approval of one or more existing preparatory courses in the college's STEM Calculus pathway. Preparatory courses with interim approval do not meet all three standards of §78213(f)(1) but have a two-year STEM Calculus 1 throughput greater than 50% for Lowest STEM Placement students. If interim approval is granted, colleges will implement the STEM Calculus Pathway Placement rules with the interim course or courses as an option for Lowest STEM Placement students by July 1, 2025.

For Option C2, the college-specific report provided by the CO already indicates interim approval. No data submission is required.

Option D (Innovative Course Option): Colleges choosing this option are planning to enact the STEM Calculus Pathway Placement rules with the innovative preparatory course option for Lowest STEM Placement students by July 1, 2025.

Data submission is not required.

OPTION B1 - UPLOAD AB 1705 STEM DATA VALIDATION TEMPLATE TO SUBMIT LOCAL DATA

8) You selected Option B1: Apply for validation approval based on local data submission. Please select the "Browse" button to upload a copy of your college's completed Data Validation Template by July 1, 2024.

OPTION C1- UPLOAD AB 1705 STEM DATA VALIDATION TEMPLATE TO SUBMIT LOCAL DATA

9) You selected Option C1: Apply for interim approval based on local data submission. Please select the "Browse" button to upload a copy of your college's completed Data Validation Template by July 1, 2024 for interim approval.

CERTIFICATION SIGNATURES