

**REVISIONS TO DISCIPLINES LIST FORM
PLEASE TYPE**

(Note: Only typed forms will be accepted.)

DATE SUBMITTED: _____

DISCIPLINES LIST TITLE: Mathematics

This proposal is for a New discipline
 Revision to existing discipline

Reason for the proposal Create a new discipline
 Update language in existing discipline to reflect new terminology
 Make minimum qualifications in existing discipline more restrictive
 Make minimum qualifications in existing discipline less restrictive

PROPOSAL LANGUAGE: (If this is an existing minimum qualification, please include the original language and change using strikeouts and *italics*).

Master's in mathematics or applied mathematics

OR

Bachelor's in either of the above

AND

Master's in statistics, physics or mathematics education *with a minimum of 18 units of graduate-level mathematics*

OR the equivalent

PROPOSAL EVIDENCE:

Any Disciplines List proposal must have the following evidence, which is essential because it provides the rationale about why the change is needed as well as inform the field that the research has been completed to ensure that the change is necessary. A lack of documentation about the need of Discipline List Revision may cause the proposal to be delayed or rejected by the Executive Committee. Please use the following check list to ensure all you have conducted all necessary research.

Required investigation of the following and statement of findings:

- Contacted an associated professional organization to determine support of proposal**
Letters of support have been requested from CSU and UC mathematics departments and will be forthcoming.
- Included evidence of degrees within the proposed revision of the discipline or new discipline.**
Examples of Math Education Masters degrees with required graduate-level math courses are CSU San Diego, CSU Long Beach, and UCLA.

- ☑ Provided a list of the titles of the degrees and programs to document the need for a new or revised discipline using the below criteria. Examples of minimal graduate level mathematics coursework includes courses in the fields of: a)Real Analysis, b)Abstract Algebra, c)Complex Analysis, d)Linear Algebra, e)Numerical Analysis, f)Topology, and g) Ordinary, or Partial Differential Equations. The following degrees are geared toward secondary instruction and lack minimal graduate mathematics coursework.

MS Mathematics Education – CSU Chico
MA in Teaching Mathematics – CSU San Bernadino
MA Math Education – Fresno Pacific University

- ☑ Provided statewide need documented by evidence to show a change is necessary and not merely a response to a unique need of one college, district or region. Demonstrated a balance of need across the state and included a discipline seconder from another district.
 1. With the expansion of dual enrollment and early college it is essential that colleges maintain an equitable level of qualification and preparation.
 2. With the implementation of AB 705 and AB 1705, remedial course offerings are essentially eliminated across the state. Thus, every student is entering a university-level class. Given the absence of the masters in math education as meeting minimum qualifications for teaching lower division courses at the university, community colleges should follow.
 3. Graduate-level mathematics courses promote thinking like a mathematician. They also form the foundation for the true practice of mathematics. College students deserve to be exposed to as rich an undergraduate experience as possible.
- ☑ Explained the impact of proposal across the state using a list the pro and con arguments and including refutation of the con arguments
Pros
 1. Math education programs have vastly different course requirements. Many are geared specifically for secondary instruction, while others, often private, are completely devoid of any graduate-level mathematics courses. Requiring a minimum number of graduate units in mathematics ensures a greater level of preparation across the applicant pool.
 2. We must ensure that Early College and Dual Enrollment programs are providing the same level of instruction as the rest of the colleges. Many high school teachers pursue Masters in Math Education degrees with the assurance they will be qualified to teach at the Community College level. In practice, however, these degrees do not make job applicants competitive. They are simply overshadowed by a pool dense with stronger degrees accompanied by excellent teaching records. Revising our minimum qualifications will help ensure our early college students have an equitable level of instruction with traditional college students, and enhance partnerships among secondary institutions and the California Community College system.
 3. Graduate-level mathematics increases knowledge of mathematical horizons; that is, an awareness of how mathematical topics are related throughout the expanse of the curriculum (Hill, Ball, & Shilling, 2008). University-level students are privileged having instructors with PhDs or at least lecturers with Masters degrees in the field of mathematics. This depth of content knowledge possessed by such instructors allows them to illuminate even the most remedial of topics along a trajectory of rich mathematical thinking and learning, Community college students should not be given less simply because they are choosing a different path to their undergraduate degree.

Cons

1. The goal of teaching is student learning. Someone with a bachelor's degree in mathematics has successfully completed more than the mere lower division courses taught at a typical community college. Therefore, an argument can be made that such a professional possesses sufficient content knowledge, and that gaining a Masters in Math Education increases pedagogical effectiveness. Thus, any restrictions on the current minimum qualification removes content experts who have been trained to teach effectively.
2. Many high schools lack teachers with content-area Masters degrees. Furthermore, access to MS/MA programs in mathematics is largely limited, while Masters in Math Education are much more prevalent and flexible. Allowing high school teachers to be minimally qualified with an unrestricted Math Education degree ultimately increases access to college classes for our state's secondary students, many of whom may not otherwise go to college.
3. Changing the language is unnecessary. Colleges and departments operate with a certain level of autonomy and can screen out applicants who lack the graduate mathematics desired. The state's minimum qualifications are just that – *minimum* qualifications. An applicant possessing a mere minimum does not obligate any college to move them forward from the applicant pool.

Refutation

1. While a bachelor's degree ensures content knowledge beyond the community college level, the distance between lower division mathematics and the mathematics required for a bachelor's degree is insufficient for making meaningful connections appropriate to the college level. Shulman (1987) presented a seminal argument that pedagogical knowledge itself is an inadequate foundation for effective teaching, and that pedagogy must be coupled with advanced content knowledge. Over the last 30 years, math education research has expounded upon Shulman's thesis to the point that it is now taken for granted that pedagogy alone does not ensure effective mathematical instruction. Hence, it is foolhardy to accept that education programs are the sole producers of good teaching practices.
 2. Many high school teachers possess Masters degrees that are geared toward secondary instruction. If their Masters in Math Education is specifically designed for secondary instruction, then, by default, it is not designed for college instruction. Under district-level pressure to approve such instructors for dual enrollment, the result is a separate and unequal para-college. Any high school student enrolled in a college's courses is worthy of receiving qualified instruction commensurate with the rest of the campus.
 3. The change in language is necessary because there are disparate goals among Masters in Math Education programs. Some, if not most, are geared toward secondary instruction. It is a disservice to Math Education students to tell them they will be minimally qualified to teach community college when, in practice, community college math positions are overwhelmingly awarded to candidates with graduate-level mathematics coursework.
- Provided other evidence such as significant changes to the field that requires a change to the Disciplines List.
1. With the passage and implementation of Assembly Bills 705 and 1705, students, except in rare cases, are placed directly into transfer-level math courses. Since community college transfer classes are considered university-level, the qualifications of the instructors should be consistent with university requirements.

2. There are several Math Education Masters programs whose coursework focuses exclusively on the secondary classroom. The secondary classroom is not the college classroom. Revising the minimum qualifications parses such degrees from those with a focus appropriate to college instruction.

Provided a ½ page written rationale to be included in public documents.

DRAFT

SUBMISSION

Once a proposal is received by the Senate Office, it is reviewed by staff to ensure that all the information is complete and includes the revision, contact information, appropriate signatures and rationale. The Senate Office will also check to ensure that the proposal has not previously been considered and rejected by the delegates at a plenary session or, if it has, it is supported by a new rationale. The proposal is then sent to the S&P Chair to review the Senate Office information and to ensure that the proposal meets the initial requirements of the Disciplines List review process as well as to verify that the proposal is not being submitted to deal with a district-specific problem that does not apply broadly. If there are any concerns with the proposal, the S&P Chair, working with the S&P Committee, will immediately follow up with the initiator.

The contact person (or a designee) will be required to attend hearings where the proposal is presented. These hearings are typically held at the ASCCC plenary sessions. It should be noted that the contact person is responsible for investigating and documenting the need for changes to the Discipline List.

Please reference the Disciplines List Handbook for information about the process including the role of the initiator, the Standards and Practices Committee, the Executive Committee, and the delegates. This handbook can be found on our website at <http://asccc.org/disciplines-list>.

Contact person (author of proposal) Joshua Lewis
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Signature of College Academic Senate President¹ _____
College _____
Email _____ Date approved by College Academic Senate _____

OR
Organization _____
President _____
Date Approved by Organization _____ Phone for President _____

RETURN FORM TO: The Academic Senate for California Community Colleges
One Capitol Mall, Suite 230, Sacramento, CA 95814
Email: disciplineslist@asccc.org

¹ By signing this document, the Senate President is certifying that the required investigation and statement of findings have been sufficiently addressed.

Rationale for Revision

The current minimum qualifications for teaching mathematics include a B.S. in Math with a Masters in Math Education. The problem is that MS/MA degrees in math education vary widely in both scope and purpose. Some explicitly state they are designed for secondary instruction. Some are completely devoid of graduate-level mathematics, while others require a minimal amount of graduate level math courses. In a standard hiring pool, these degrees are often overshadowed by Masters and PhDs in the subject area of pure mathematics. And yet, given the recent demands of dual enrollment, high school instructors possessing a Math Education MS/MA are being forwarded for approval to teach our college courses as dual enrollment. In some cases, new graduate programs are being sold as guaranteed qualification for teaching dual enrollment. In an effort to combat undue institutional pressures to approve instructors who may not otherwise be considered, and as a means of controlling the immense disparity in graduate-level mathematical coursework, the Senate is asked to revise the minimum qualifications to remove Math Education. This does not necessarily preclude graduates of a Masters in Math Education from the application process as it still allows for them to pursue an application of equivalency if they possess an appropriate amount of subject-specific graduate coursework.

REFERENCES

- Hill, H. C., Ball, D. L., & Schilling, S. G. (2008). Unpacking pedagogical content knowledge: Conceptualizing and measuring teachers' topic-specific knowledge of students. *Journal for Research in Mathematics Education*, 39(4), 372–400.
- Shulman, L. S. (1987). Knowledge and teaching: Foundations of the new reform. *Harvard Educational Review*, 57, 1-22.