



## Math Department Position on Course Unit Values

The MJC Department of Mathematics takes the following positions regarding the ongoing debate and controversy about the unit values of its courses:

Course units are based on the content that is required to be covered in the course and the time required to cover that content in a way that realistically allows for student comprehension and retention. Related issues such as financial aid, "extra" transfer units, and the amount of time a student must devote to a course should be considered, but must not supersede these requirements.

The overriding concern of the mathematics faculty is our students. Our curriculum is designed to cover the material the students need at each level in a way that gives them a reasonable chance of succeeding, but also ensures that they are prepared for subsequent coursework. Mathematics builds on itself – faculty cannot skip topics. Mathematics is abstract and subtle – students need some time in class for discussion and questions. Removing class time puts our students at risk and this is unacceptable.

The following topics have become part of this conversation. We hope you will carefully consider them. Ask us questions, come visit our classes and ask our students about these issues. We are proud of our program and we welcome your interest.

1. **State Mandate:** There is no state mandate to reduce the units in our Calculus classes. There IS a state mandate to permit only 60 total units in the Computer Science degree. One possible solution is to lower the units in Math 171 and Math 172, but an equally viable solution would be to lower the units in other required courses.
2. **Financial aid:** After communicating with the Financial Aid Department at MJC, we discovered that the math department is not putting our students at risk of running out of financial aid with our courses being 5 units. In fact, students have six years of financial aid support and 90 units of attempted course work. It was also communicated that there is an appeal process for the students in case they require additional financial aid.
3. **Extra Units:** We asked Ruth Cranley what happens when a student transfers with courses from MJC that do not have the equivalent number of units at the transfer university, using a Math major as an example. If the student had more units than the minimum of 60 units to transfer, the extra units would likely be used to meet GE and major preparation requirements. Thus the units are generally not "wasted". If the student transferred an MJC course that has fewer units than the articulated transfer university course, they would still get credit for the course.
4. **Compare apples to apples:** The correct program comparison is community college to community college. Among all community colleges in California, 75% of them have five or more weekly contact hours in Calculus 1. Another good comparison is with colleges in our cohort. Among colleges in our cohort, 94% of them have 5 or more weekly contact hours in Calculus 1.

Here is the cohort comparison for our Calculus courses:

Four Contact Hours, Four Units: Bakersfield.

Five Contact Hours, Four Units: Porterville.

Five Contact Hours, Five Units: Cerro Coso, Contra Costa, Cuyamaca, Evergreen, Grossmont, Mission, Palomar, Reedley, San Joaquin, San Jose, West Valley.

More than Five Contact Hours, Five Units: Chabot, Fresno, Las Positas, Long Beach City.

5. Statistics can be dry at times, but...Our data is both deep and wide. The Math Units spreadsheet is a survey of all CCC's. We compared Math 70, Math 90, Math 134 and the Calculus sequences of all these colleges. Our goal was to determine whether our program is typical or not among other Math programs throughout the state. Here is the link to the spreadsheet: <http://tinyurl.com/CCCMathUnits2014>

6. Student surveys: Several instructors have surveyed their student about whether the contact hours in their math classes should be reduced or maintained. The students consistently indicated that the contact hours are appropriate. These surveys are available on request.

7. Basic Skills and Student Success: Many community college students across the state and at MJC place below college level math. We offer Math 70 and Math 89 or Math 90 as a brief two-semester version of content that is taught in two years of a high school program. For students who test below the high school level, we offer Math 10 and Math 20 as a brief two-semester version of content that is taught in three years of a middle school program. Each of these courses is highly accelerated when compared to their K-12 counterparts. Students who were unable to learn this material in 36 weeks struggle to learn it in 15 weeks. Yet we are still able to maintain our Student Success results in this sequence of courses at, and indeed above, the state average. Reducing the contact time with students in Basic Skills will unavoidably lead to a reduction in Student Success, in one of two ways: Either the content will stay the same and students will simply have less time to get help learning it, or the content will be reduced. Since mathematics is highly accumulative, and all our courses already contain only the essential content, a reduction in content will allow students to pass the class they are in by sacrificing their ability to pass their subsequent classes.

8. Pedagogy and the Dumbing Down of America: Decreasing the units in courses will weaken the quality of those courses. A faculty member faced with reduced units will be forced to make a lose-lose choice: either they will need to reduce the content that they cover, or they will need to devote less time to the content. In mathematics, we cannot reduce our content. We will be required to cover the same content in four contact hours that for decades we have covered in five contact hours. Most faculty will likely eliminate time for questions or for discussing difficult material. Pedagogical best practices in mathematics require us to spend time on challenging examples and answering questions. As instructors become frustrated with the decreasing success of their students, they will undoubtedly start eliminating or minimizing difficult topics, and they will need to stop assigning 'rich' problems that open the door to student understanding because there will be no time to discuss them. Students will no longer be

expected to understand ideas, and instead will only be expected to demonstrate skills. Should faculty be battling for dumbing courses down, or fighting against it?

9. MJC Mathematics Program and our students:

Many student who are college ready need only one 3-unit math course to transfer. We offer the following 3-unit courses:

Math 101 (Math for Liberal Arts)

Math 111 – (Applied College Algebra) originally designed for Agriculture students

Math 130 (Finite Math) for Business Majors and some Computer Science Majors

Math 138 (Business Calculus) for Business Majors and Social Sciences

Math 105 for Elementary School Teachers

Math 106 for Elementary School Teachers

Students who need statistics can take Math 134 – a 5-unit course, proposed to reduce to 4 units (pending Curriculum Committee approval)

STEM students require more math – 3 semesters of Calculus and 1 semester of combined Linear Algebra and Differential Equations for a total of 20 units

Each of these courses has been thoughtfully designed to be consistent with state-wide and national norms. Like all faculty at MJC, we must offer courses that students will have a reasonable chance of passing and that prepare students who do pass to succeed in subsequent coursework.

10. In 2008 the state enforced an alignment between units and contact hours, which required us to increase the units in several courses across the college. For these math courses the content, contact hours, and workload were not changed:

	1991 units	1991 contact hours	Current units	Current contact hours
Math 70	4	5	5	5
Math 90	4	5	5	5
Math 171	4	5	5	5
Math 172	4	5	5	5
Math 173	4	5	5	5
Math 174	4	5	5	5

For many years, the emphasis in education was **Student Success and Academic Excellence**. We now appear to be in an era of educational quantity (run the students through) rather than quality. Hopefully, if faculty insist on returning to Student Success and Academic Excellence, this current era will soon pass.

Every Mathematics teacher we have ever been in contact with has been frustrated by the difficulty students have learning math. We have all had many students tell us "I make A's in all my other courses, but I just can't understand math". We want our students to succeed, but to succeed through learning the material. To that end, in the last 23 years, some changes have been made – always approved by the Curriculum Committee of course, who have been similarly frustrated by these issues.

Math 20 units increased with the idea that a better foundation would help these students move through the curriculum more efficiently. We have measured an increase in our Math 20 and Math 70 success rates following that increase.

The Math 121-122 PreCalculus sequence used to be Math 115 – 120. We have not measured a corresponding increase in success rates in Calculus, this change is being reassessed and alternatives are being considered.

The units for Math 134, Statistics, were increased for two reasons. First, some UC schools were not accepting it because it was lacking two large topics. Also around that time an open computer lab

became available to us. That was back before computers were ubiquitous. The availability of the lab allowed us to create a technology component as now is required in the Math 110 C-ID descriptor.

Math 70, 90 171, 172, 173, and 174 were changed *only in units*, but *maintained the same contact hours*.

#### 11. Math Department Initiatives for Student Success:

In the past 23 years, the Math Department has met the challenge to increase student success with many measures other than increasing units.

**Tutoring:** Many years ago, MJC had no tutoring program. The first official tutoring system was created by the Math Department. Over the years tutoring at MJC has grown and gotten more formal, but the Math Department is still a central component.

**Supplemental Instruction:** SI programs utilize a qualified student who attends an instructor's class, then holds tutoring for the students in the class. The Math Department was the first area on campus to investigate and begin using SI.

**Math with Pizza:** Students are welcome to eat pizza and improve their math skills while they eat. The meetings are held monthly and focus on different topics each month.

**Mathematical Problem Solving Seminar:** Twice a month students who attend this seminar work on the more unusual and creative math-contest-type problems.

**Stanislaus Math Council Junior High and High School Math Contests:** MJC faculty write and grade the contest exams. Then we get to watch the proud winners get ribbons and trophies.

**Distance Education:** The Math Department led the way in teaching with a variety of distance modalities. It began with televised courses many years ago, but we were also an early adopter of online classes. Our department has an early version of a MOOC back in the mid-90s. That same online course was eventually broadcast to all community colleges in the state and the Chancellor's Office. The recent decision to no longer schedule online Math courses was based on the right of assignment, and was not a faculty decision.

**Hybrid Courses:** The Math Department has always had several courses offered in a hybrid form to serve the needs of our students who have careers, job, and families.

**Online Resources:** Many Math Department faculty in recent years have integrated more online resources for their classes, such as online homework, supplemental videos, and class notes posted to web sites.

**Make-the-Connection:** Professors volunteered time on Fridays in an open classroom to provide extra math assistance to any student who dropped in.

**Friday Stat Lab:** Statistics instructors volunteer several hours on Fridays for an optional problem-solving practicum, which is well attended by statistics students.

Graphing Calculator Loan Program: Student can borrow either a graphing calculator or a scientific calculator for a whole semester at no cost.

Flipped Classrooms: A couple of our professors created videos of their lectures so the students can watch the lectures at home before the class session. Then the in-class time is devoted to exercises, projects, or discussions.

Slate Computers from the HSI-STEM grant: Several Math faculty are piloting the use of slate computers as a lecture tool, allowing more direct student interaction and integrating technology-dependent resources into the classroom experience.

Boot Camp and Math Jam: A week-long program prior to the start of the semester to help students be more prepared for their classes. Many of our professors created lessons, worksheets, and answer keys for those who attend the Math Jam and will be placing them online for those who cannot attend.

12. The jealousy factor: We have been told that some faculty are frustrated because they need more units in their courses. The correct solution is not to take away units in our courses. All courses should have the appropriate number of units.

13. The Workload Connection and FTES: Lowering the units of math classes will lead to a reduction in FTES. Arguments have been made that this is not the case, because math faculty will teach more classes in order to maintain their load factor. While this may be true for a few faculty, it is not true for all faculty. Full-time math faculty are encouraged to take overload classes, and many faculty already teach classes that are below five units. For many of us, the proposed reduction in course units would only affect one or two classes in our load, simply reducing our overload by one or two units. The motivation to add another course would not be as strong as it might seem. With adjunct instructors, a change from 5 units to 4 would not allow them to teach any additional courses. They have a 10-unit maximum on what they are allowed to teach. The only effect would be to pay them less. And no new classes would be staffed. Every qualified adjunct we can find is already teaching at capacity. This also assumes that there is an infinite supply of students waiting to take a math course. Rumor and anecdotes notwithstanding, this is not true. Although our courses start the semester with very full wait lists, faculty typically take almost everyone who shows up in the first week. Only a few are turned away, maybe enough for another section or two, but not enough to make up the loss in FTES. A net loss of FTES is unavoidable.

It is clear that workload is an integral, if not primary, component in this push to decrease math units. Regardless of your opinion of the Math Department's workload, the Curriculum Committee is not the appropriate venue to make adjustments or corrections in workload. Workload is a negotiable issue and must be handled by YFA. All faculty will lose if administrators get to unilaterally determine workload, or if workload issues are decided outside of our union's negotiations.

14. Setting precedent: Allowing non-discipline faculty to significantly alter the math curriculum sets a precedent that should concern all faculty. Curriculum in all areas should be created by those who know that subject and have experience teaching it. If that principle is not upheld for the math curriculum, every area loses control over its own curriculum.

In conclusion, we understand that the Curriculum Committee is a vital safe-guard against frivolous or sub-standard curriculum. However, committee members must rely heavily on local discipline faculty to provide the information necessary to make knowledgeable decisions. Non-discipline faculty cannot be expected to have the same level of expertise as discipline faculty in these matters. But non-discipline faculty can and should look at common practice, school policies, state laws, and past practice to determine whether curriculum is in line with state- and nation-wide norms and standards and they must consider all implications and ramifications of failing to approve the curriculum submitted by discipline faculty.

The Math Department has made an extraordinary effort to address the many concerns about our curriculum. Our extensive research has confirmed our belief that most of our courses have standard content and a typical number of units. However, we did find that some of our courses have units that are not the modal number of units throughout community colleges in the state, and we have taken steps to bring those courses in line. This is the correct way to review curriculum – using a scalpel rather than an ax – and our program will better serve students through this effort. And that's really the bottom line for all of us. Whether they are transfer students or basic skills, whether their goal is to get a degree or just to understand math for the first time in their lives, our students deserve the best we can give them.

*Respectfully submitted on November 25, 2014 by Mike Adams, Curriculum Committee Representative, on behalf of the MJC Mathematics Department*