I. Service Area Name  Math, Science and Engineering (MSE)

II. Date of Review  May 29, 2015

III. Service Area Mission Statement (optional)

IV. Service Area’s key duties, responsibilities, functions, activities, and tasks

The Area of Math, Science and Engineering has 4 key tasks.
1. Provide basic skills preparation in Math
2. Provide lower division preparation for transfer in Math, Science and Engineering
3. Confer Associate’s degrees in MSE
4. Offer key courses for General Education in the following areas
   Natural Sciences/Language and Rationality (Hartnell),
   Physical Universe and Its Life Forms (CSU Breadth)
   Mathematical Concepts and Quantitative Reasoning/Physical and Biological Sciences (IGETC)

V. Greatest strengths and most significant accomplishments during the past three years

MSE has developed and maintained model STEM student support through grants and other efforts. The Science and Math Academies, STEM Summer Bridge programs, STEM Internship Program, and efforts in tutoring and supplemental instruction funded
through Department of Education STEM grants, MESA and other programs are exemplary. These “STEM umbrella” programs comprise the Science and Math Institute (SMI) and have been shown to be highly successful.

The SMI programs have strengthened the STEM degree pipeline at Hartnell significantly. We have:

• expanded the number of college level sections of STEM related courses by 35%,
• increased the number of students in STEM majors courses by 122%,
• increased the number of students who persist to the advanced level courses by 175%.
• increased the total number of active STEM majors by 44% (443 in 2013-14. The largest increases have been seen in biology (75% increase in majors) followed by math (44%), engineering (40%) and chemistry (34%).
• increased the number of STEM associate degrees awarded by over 240%
• and increased the transfer rate of STEM students by 59%.

The grant funding that supported these programs has been reduced by half in the last year, and may undergo a similar reduction when our 2 Department of Education STEM grants conclude in September of 2016. The budget requests from MSE this year, founded in MSE discipline and SMI PPAs, endeavor to institutionalize and sustain the most successful of these the programs established with the grants: particularly the STEM Internship Program, the Math and Science Academies, and the SI program.

In curriculum, Hartnell MSE faculty is actively engaged in keeping our degrees on the cutting edge. AS-Ts have been developed for math and physics. Astronomy recently built a degree. This spring chemistry and biology have approved TMCs, and the high-unit engineering field has released a similar Model Curricula for a variety of engineering degrees. Melissa Hornstein has been actively following this development and has already been aligning our program to the changes. The Geology AS-T will be ready to for approval in Fall 2015.

Learning Outcome assessment is well under way in MSE. All programs have assessed at least one of their Program Learning Outcomes. Of the 68 active courses/course groupings (i.e. MAT L-Series) 66 of them have had their SLOs assessed during the last 2 years. The remaining two courses went through revision changes in the Fall to align them with the C-IDs, and are being offered and assessed this term, Spring 2015. MSE has 6 classes that are in current flux. Two are part of the Earth Science degree; once the degree work in Earth Science/Geology have been completed, the remaining barriers will be removed. The remaining classes are in Math. MAT 151 was tried as an L-series section, but as comparable online ALEKs resources are not available, this is not a successful modality for this class. MAT 205 and 206 are classes that supported learning
in the Math Lab. As we will be getting this functionality back, these courses will be revised to correspond.

MSE has a moderate Distance Education program, with one AST, 3 BIO, 1 GEG courses offered in science and 3 courses offered in math online. The Math L-Series is a hybrid course.

MSE has worked to build a scheduling grid that coordinated the courses needed for STEM majors, with the goal to reduction in schedule conflicts for science and higher-level math courses. Ongoing efforts are being made to try to move this grid into the new building and to adapt to a 16-week term.

Offering enough math courses to support the growing STEM pipeline and basic skills needs has been a problem over the last 3-4 year. Starting last fall, a new model was used to address classroom storages. A set of classrooms have been devoted to math, and sections offering have been pushed to throughout the day. Section numbers have increased. We have now had 3 terms of registration with a larger schedule, and math availability is much less of a barrier to student progress.

The Science and Engineering faculty and staff have participated in a great deal of planning to design effective teaching labs, instrument rooms, stockrooms, and storage areas for the new Science building. The opening of the building for classes is currently expected for Summer 2016.

VI. Major challenges during the past three years—that is, the aspects that are most in need of improvement

As we schedule higher numbers of math sections to meet student need, we continue to struggle with finding qualified instructors. Over recent terms multiple math classes have been taken off the schedule because they could not be staffed- between 4-6 per terms in the last couple of semesters. With a new hire awarded to math for 2015-16, math still needs an additional hire or two.

As growth in chemistry will require increased lab support and supply monies, the Department of Education STEM CUSP grant is providing interim funding for a full-time technician, while a permanent position finds its way through the 2016-17 budgeting process. With restructuring of effort, biology can put in place 2 FT lab technicians.

The math faculty has been watching the trends in Basic Skills Math over the last few years. Many high school students have been placing at a level that is lower or the same than the last math class they took. The math faculty, along with English and counseling faculty, have been working to support high schools to better prepare students for
testing. Placements seem to be improving, with the need for the lowest level of math sections decreasing. This effort is ongoing as more improvement is expected.

With the loss of the Student Support Center, the math program lost access to a broad-based structure for offering math support through high-level calculus. Recent efforts indicate upcoming reestablishment of a Math Learning Center that will address and meet students' diverse learning needs in mathematics to promote student success in mathematics at all levels. It is hoped this item can be moved from the “challenge” to “accomplishment” section of the MSE Summary in the next cycle.

As our current Title III STEM grants finish in September 2016, the budget requests from MSE this year endeavor to institutionalize and sustain the most successful of these the programs established with the grants: particularly the STEM Internship Program, the Math and Science Academies, and the SI program. The successes in increasing the STEM pipeline may not be able to continue without sustaining some of these key programs.

VII. Brief summary of continuous quality improvement actions to be taken that will help to build upon strengths and address challenges.

MSE is working to offer math classes at a level and on a schedule that meets student need. Staff and space will be needed to achieve this goal. Growth is needed in biology, chemistry, engineering, and physics as well.

MSE strives to bring relevant and innovative teaching practices to students, both in and out of the classroom. This effort includes new technologies like IPADs and DLA, but an eye also needs to be kept on insuring the labs and classrooms remain current and well-supplied. Looking forward Science is working to prepare for the large scale moves that will come with bringing the new Science Building online.