**Sinclair Community College**

**Continuous Improvement Annual Update 2014-15**

**Please submit to your Division Assessment Coordinator / Learning Liaison for feedback no later than March 1, 2015**

**After receiving feedback from your Division Assessment Coordinator, please revise accordingly and make the final submission to your dean and the Provost’s Office no later than May 1, 2015**

**Department:** 0351 – Mathematics

Year of Last Program Review: FY 2013-2014

Year of Next Program Review: FY 2018-2019

**Section I: Department Trend Data, Interpretation, and Analysis**

**Degree and Certificate Completion Trend Data – OVERALL SUMMARY**

Please provide an interpretation and analysis of the Degree and Certificate Completion Trend Data (Raw Data is located in Appendix A*): i.e. What trends do you see in the above data? Are there internal or external factors that account for these trends? What are the implications for the department? What actions have the department taken that have influenced these trends? What strategies will the department implement as a result of this data?*

The number of students completing the Associate of Mathematics (MATE.S.AS) degree each year has remained relatively constant, and low.

Effective beginning in the 14/15 academic year, we made some changes to the degree to make it fit an articulation agreement with Wright State that matched MATE.S.AS to Wright State’s bachelor’s degrees in pure math, applied math, and secondary math education.

Effective beginning in the 15/16 academic year, we made additional changes to MATE.S.AS to fit a new articulation agreement with Wright State that matches us to their bachelor’s program in statistics.

These changes reduced MATE.S.AS from 62 to 60 hours, removed the need to take coursework that wouldn’t transfer, and made it possible to take additional courses that will transfer.

Upon reflection, it is apparent that what we have not done yet is to market these new articulation agreements to students. We will immediately construct flyers for distribution in classes and in the Math Lab.

Also effective beginning in the 15/16 academic year is a new one-year certificate in Pre-Actuarial Science. E-mail surveys of students in the MATE.S.AS program showed that many of them are actually interested in Actuarial Science. Actuarial Science is offered as a minor with the bachelor’s degree in math at mid-size universities like UD and Miami, and it is a major unto itself at large universities like UC and OSU. The new certificate is designed to capture all first and second year technical requirements for actuarial science programs (which includes calculus, economics, and accounting), and also to fit entirely within the MATE.A.AS degree. We have begun marketing this new certificate at high school career fairs this spring, but again, we need to work on marketing this to our existing students.

It is hoped that in future years all of these measures will lead to larger numbers of degree completers and also now certificate completers.

**Course Success Trend Data – OVERALL SUMMARY**

Please provide an interpretation and analysis of the Course Success Trend Data (Raw Data is located in Appendix A). Looking at the success rate data provided in the Appendix for each course, please discuss trends for high enrollment courses, courses used extensively by other departments, and courses where there have been substantial changes in success.

The highest enrollment class offered by the Math Department is Beginning Algebra, which was MAT 101 on quarters and is now MAT 1270 on semesters. The success rate in MAT 1270 over the last two years has been at least 3.1 percentage points higher than it ever was in MAT 101 in the previous five years.

The second highest enrollment class offered by the Math Department is Intermediate Algebra, which was MAT 102 on quarters and is now MAT 1370 on semesters. The success rate in MAT 1370 over the last two years has been at least 4.7 percentage points higher than it ever was in MAT 102 in the previous five years.

I attribute these increases to a new, more coordinated structure for both classes that was introduced during the 11/12 academic year. Under the new structure, all instructors are provided with a premade syllabus, a daily schedule tailored to their section, a homework worksheet for every section, a set of online homework assignments and quizzes, and a detailed set of guidelines for how to write each exam. These materials especially help new adjunct faculty, as they provide guidance on what to cover, and they also free up more time for preparing lessons.

The third highest enrollment class offered by the Math Department is Allied Health Mathematics, which was MAT 106 on quarters and is now MAT 1130 on semesters. This course is used extensively by programs in the Health Sciences Division. The success rate in MAT 1130 over the last two years has been consistent with the success rate of MAT 106 over the previous five years. Beginning in fall 2014, a structure similar to that which we have been using in MAT 1270 and MAT 1370 was introduced to MAT 1130. Hopefully, we will be able to report a similar bump in success rates in future years.

The fourth highest enrollment class offered by the Math Department is College Algebra, which was MAT 116 on quarters and is now MAT 1470 on semesters. The success rate in MAT 1470 over the last two years has been at least 6.5 percentage points *lower* than it ever was in MAT 116 in the previous five years.

According to data compiled by RAR in spring 2014, MAT 1470 students who tested into MAT 1470 have a success rate of 50.99%, which is consistent with the overall lower success rate in MAT 1470.

In the same study, it was found that MAT 1470 students who did not test into MAT 1470 (and so presumably took MAT 1370 or possibly an equivalent class at another college) have a success rate of 70.65%, which 4.15 percentage points higher than it ever was for MAT 116 during the last five years on quarters.

This data seems to imply that Accuplacer is the root cause for the decrease in the success rate of College Algebra students. It is not clear why Accuplacer is creating a problem now that it was not creating on quarters. To investigate further, a group of four math faculty members each took the Accuplacer math placement test multiple times. The purpose of this investigation was to determine if different cut scores might be more appropriate. However, it was determined that the test is so far out of alignment with Sinclair’s math curriculum, that no obvious improvement could be made by changing cut scores.

To address this problem, a new system of math placement tests is being piloted in 2015. A limited trial run was conducted by the Testing Center in January, and a more extensive trial will take place this summer.

Please provide any additional data and analysis that illustrates what is going on in the department (examples might include accreditation data, program data, benchmark data from national exams, course sequence completion, retention, demographic data, data on placement of graduates, graduate survey data, etc.)

The Math Department provides a final exam for all sections of Beginning and Intermediate Algebra. It is 20 questions long and multiple choice. There four versions of each question, which are of similar type but with different numbers. Each section is given an exam in which one version of each problem was randomly chosen. This allows us to make objective comparisons between sections in a given term, and between terms.

The new, heavily coordinated structure for Beginning and Intermediate Algebra that was discussed in the previous section was implemented in Fall 2011 for Beginning Algebra, and Winter 2012 for Intermediate Algebra. The average score on the department final exam jumped up in Fall 2011 and never came back down. A similar thing happened for Intermediate Algebra in Winter 2012. These elevated final exam scores have persisted up through 2014.

Prior to the new structure, the department final exam average for both courses was always in the D letter grade range. Since the implementation of the new structure, the department final exam average has always been in or above the C letter grade range.

Average Score on Department Final Exam

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|  | Beginning Algebra  MAT 101 or MAT 1270 | Intermediate Algebra  MAT 102 or MAT 1370 |
| Fall 2014 | 74.2% | 78.2% |
| Spring 2014 | 72.2% | 73.3% |
| Fall 2013 | 73.7% | 77.7% |
| Spring 2013 | 69.2% | 77.0% |
| Fall 2012 | 74.3% | 80.4% |
| Spring 2012 | 71.3% | 72.6% |
| Winter 2012 | 73.9% | 69.6% |
| Fall 2011 | 75.5% | 65.6% |
| Spring 2011 | 68.0% | 63.5% |
| Winter 2011 | 68.3% | 62.5% |
| Fall 2010 | 66.4% | 63.7% |
| Spring 2010 | 65.9% | 62.4% |
| Winter 2010 | 67.9% | 61.9% |
| Fall 2009 | 68.9% | 61.3% |

**Section II: Progress Since the Most Recent Review**

Below are the goals from Section IV part E of your last Program Review Self-Study. Describe progress or changes made toward meeting each goal over the last year.

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| **GOALS** | **Status** | **Progress or Rationale for No Longer Applicable** |
| **The department is close to completing the new pathway for Associate of Arts students, MAT 1340 Mathematical Reasoning and MAT 1445 Quantitative Literacy, known as Quantway®.** This new accelerated path allows arithmetic-ready AA-seeking students to complete their mathematics requirements in two semesters rather than the three semesters required in the traditional path, while providing them with a firm foundation in critical thinking skills for everyday life. Research into expanding Quantway®-modeled courses is also ongoing. | In progress  Completed  No longer applicable | MAT 1445 was approved as a Sinclair course and as an OTM course effective Fall 2014. It was offered in both Fall 2014 and Spring 2015, but did not run either time. However, students taking MAT 1340 have still been able to complete the requirements for the AA degree in two semesters by taking MAT 1440.  At the outset of the Quantway initiative in 2009, the stated goal was to increase the number of students completing the math requirement for the AA degree by 50% over five years. That goal has been accomplished.  In 2009, 148 students completed MAT 108 (the quarter version of MAT 1440) with a C or better. In 2014, 225 students completed MAT 1440 with a C or better. That is a 52% increase.  (One should also consider that Sinclair’s overall enrollment declined during that same time period.) |

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| **A new course, Discrete Mathematics, is being developed in cooperation with the CIS department and Wright State University.**  This course will make possible an articulation between a CIS associate’s degree at Sinclair and a CS bachelor’s degree at Wright State. It will also provide students with a firm foundation in the composition of proofs and other advanced topics preparing them for upper level mathematics and computer science courses. | In progress  Completed  No longer applicable | The new Discrete Mathematics course, MAT 2570, was approved as a Sinclair course and as an OTM course effective Fall 2014. It was also approved by Wright State for transfer.  MAT 2570 was offered in both Fall 2014 and Spring 2015, and it ran both times.  This course was created to complete an articulation agreement between a CIS associate’s degree at Sinclair and a CS bachelor’s degree at Wright State. That articulation agreement was signed by both institutions in February 2015. |
| **The Associate of Science in Mathematics degree is being revised to more closely align the degree with bachelor’s degrees in math at neighboring institutions and to address current concerns about the number of credit hours required to earn Associate’s degrees.** Updated articulation agreements are being pursued as well with surrounding institutions, required due to the transition to semesters, paving a smoother transition to four-year schools for students. | In progress  Completed  No longer applicable | See page 2. |
| **Changes to the mathematics placement procedures and processes currently in place are being investigated.** There has been a great deal of evidence in recent years that the standardized testing currently in use is not an accurate predictor of student success. Such changes may include basic adjustments to cut-off scores, new placement tools, and/or additional support to students during the placement process. The goal of this investigation and any proposed changes is to ensure that students are moving to completion at the fastest rate possible. | In progress  Completed  No longer applicable | See page 4. |

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| **The department would like to more carefully analyze our offerings such as the STEM pathway, the new Finite Mathematics/Business Calculus sequence, and the Quantway® sequence, tracking students before and after the sequences and comparing them to earlier cohorts.** | In progress  Completed  No longer applicable | Here is some analysis that we did on the core STEM sequence in 2014. We looked at every student who took MAT 2270 (Calculus I) in 2014 and got a grade. The overall success rate for this group was 55%. Here’s a breakdown:   * For students who had previously gotten a C or better in MAT 1580 (Precalculus), the success rate in MAT 2270 was 88%. * For students who had previously gotten a C or better in MAT 1570 (Trigonometry), the success rate in MAT 2270 was 60%. * For all other students, the success rate in MAT 2270 was 36%. (This group would include both students who placed into MAT 2270, as well as those who had transfer credit for MAT 1570 or MAT 1580. It is clear now that we should have subdivided this group.)   This data affirms the decision to promote MAT 1580 as the primary pathway to the calculus sequence, rather than taking MAT 1470 and MAT 1570 to cover the same content. MAT 1580 had roughly the same success rate as MAT 1470 for the 13/14 academic year, yet it gets the students to calculus one semester faster and, apparently, prepares them better. (The elevated success rate of MAT 1580 in 12/13 was due to requiring a B in MAT 1370 as the prereq, rather than requiring a C like we have always done for MAT 1470. For the same reason, MAT 1580 had very low enrollment in 12/13. In the fall of 2013, the prereq for MAT 1580 was changed to match the prereq for MAT 1470, and their success rates equalized.)  Each semester, we have been increasing the number of sections of MAT 1580 offered, at the expense of MAT 1470 and MAT 1570. This data validates the continuation of that process. We will continue to monitor these numbers as MAT 1580 grows. |

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| **Work is beginning on a more ‘standardized’ approach to MAT 1470, College Algebra, and MAT 1130, Allied Health Math.** Following the successful model of the MAT 1270/1370 sequence, standardized homework sets and supplemental materials will be added to the course. New departmental finals will be developed as well. The data and analysis resulting from this implementation has the potential to improve success rates and retention. | In progress  Completed  No longer applicable | This work was begun for MAT 1130 in Spring 2014, and it was completed and implemented in Fall 2014.  Similar work was begun for MAT 1470 in Fall 2014, and is ongoing. The plan is to have it completed by Fall 2015. It is expected that there will be increased dual enrollment offerings of MAT 1470 this fall that are taught by the high school teacher. This standardization will help to ensure that students receive an experience similar to what they would receive if they took MAT 1470 on campus. |
| **Additional hybrid courses are envisioned, allowing students more flexible scheduling, and courses will be offered at new locations expanding access for students.** New courses will be developed as online offerings, such as MAT 1450 Introductory Statistics, and more flexible scheduling is planned as well, such as the new experimental MW daytime sections. The department is also experimenting with a video conference course offered simultaneously at all three learning centers in the spring of 2014, and hopes to extend this to other 200-level, low enrollment courses that the regional centers need to offer to complete transfer degree programs in business and engineering. | In progress  Completed  No longer applicable | We began offering MAT 1365 as an online course in Spring 2015.  Work will officially begin on creating online versions of MAT 1450 and MAT 1570 in summer 2015. These two new online courses will be offered for the first time in Spring 2016.  MAT 2290 was offered (and successfully run) at Courseview for the first time in Summer 2014, which helped students to complete more credits toward the Engineering Transfer degrees (ESUP.S.AS), which is a featured program at Courseview.  MAT 1460 was offered (and successfully run) at Englewood and Huber Heights for first time in Summer 2014. It was offered as a video conference class. In the fall, it was offered at both locations in the traditional format. This class prepares students for the math classes necessary for the Business Administration degree (BUS.S.AS), which is a featured degree at the learning centers. As a result, MAT 2160 was able to run in spring 2015 at ELC and HHLC as a video conference class. |
| **In cooperation with the Tech Prep Program, the Mathematics Department is developing Tech Prep MAT 1370, Intermediate Algebra**, an Angel course to support high school instructors in the preparation of students for proficiency testing and for the delivery of the proficiency tests. This will be developed and implemented using the structure currently in place for Tech Prep MAT 1270. | In progress  Completed  No longer applicable | This was completed during the 13/14 academic year. |
| A future goal of the department is to have a more centralized department location with facilities for interactions between full-time and part-time time faculty, which would also allow mathematics students to interact with each other and with all faculty. | In progress  Completed  No longer applicable | Currently, a number of faculty from the Health Sciences Division have office space on the third floor of Building 1, near the Math Department Office and distributed among the majority of math faculty offices. When the new Health Sciences building is completed, presumably those faculty will get office space in the new building. Hopefully, this rare opportunity can be utilized to consolidate the offices of all math faculty and perhaps also the developmental math faculty. |
| We would also like to increase attendance at the Mathematics Department Colloquia. | In progress  Completed  No longer applicable | On quarters, we had one colloquium in the fall, one in the winter, and one in the spring. During the first academic year on semesters, (12/13), we just had one in the fall and one in the spring.  Beginning in the 13/14 academic year, we have been having two in the fall and two in the spring, so we are now having more colloquia per year than ever. |

Below are the Recommendations for Action made by the review team. Describe the progress or changes made toward meeting each recommendation over the last year.

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| **RECOMMENDATIONS** | **Status** | **Progress or Rationale for No Longer Applicable** |
| Some of the assessment work the department has done been outstanding, particularly the efforts looking at scores on common exam items and making adjustments accordingly. The department’s work with adjuncts is exemplary. These are the kinds of best practices that should be shared with the campus community. The department is strongly encouraged to find ways of sharing these kinds of best practices, perhaps through workshops, presentations, and Faculty Forum articles. | In progress  Completed  No longer applicable | The department is looking into the possibility of giving a presentation as part of the New Chair Academy. If that doesn’t work out, we will investigate other possible avenues for sharing ideas. |
| The department has cultivated excellent relationships with several four-year institutions – the Review Team was impressed by this and encourages the department to maintain these relationships. The department may want to explore whether relationships could be established with other transfer institutions. | In progress  Completed  No longer applicable | An articulation agreement with UD has been tentatively approved by their transfer officer, but still awaits formal signing by the Provosts of both institutions.  We drafted a possible articulation agreement with Miami and sent it to them to review. Based on initial feedback from Miami, it appears that Sinclair’s requirement of a COM class will prevent this articulation agreement from being approved. |

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| The department has a relatively small number of graduates, which may make in-depth tracking of these graduates more manageable. In addition to transfer and employment data that RAR provides, the department is encouraged to leverage its excellent relationships with four-year institutions to get more feedback regarding its graduates. FERPA rules would likely prohibit the collection of grades for students who transfer from the program, but transfer institutions may still be able to provide valuable feedback regarding Sinclair Math graduates. Is there an opportunity to strengthen personal relationships that might make students more willing to keep in touch with the department as they transition to other institutions? | In progress  Completed  No longer applicable | In 2013, and 2014, the Math Department sent e-mails to all students who were enrolled in the MATE.S.AS program at that time and offered to connect them with faculty advisors. In total, 14 students took us up on that, which was about 25% of the active math majors.  Starting in 2015, we will begin identifying each term all math majors who do not yet have a faculty advisor, and assigning a full-time faculty member to be their advisor. That advisor will take responsibility for reaching out to the student by phone, which is likely to have a better response rate than e-mail.  Once all math majors have faculty advisors, we will begin having the advisors submit reports on each advisee each term which will cover things such as whether their advisee graduated or when they expect to graduate. For students who have graduated in a previous term, the advisor will attempt to contact them and get an update on their current status. |
| The MATE.S.AS program has three well-written outcomes. The Review Team recommends that the department consider development of a fourth program outcome related to transfer, since of necessity graduates of the program will need to transfer to be employable. | In progress  Completed  No longer applicable | The reporting activity described in the previous box will hopefully enable us to get a better sense of where our graduates transfer to and whether they are successful after transfer. We are eager to understand this better, and will certainly report our findings in future annual updates. However, after consultation with our Dean, we have decided not to create a new program outcome. As we understand it, program outcomes must be linked to specific classes, and this worthy goal does not seem to fit with that. |
| In the discussion with the Review Team, the department mentioned the possibility of making the MATE.S.AS degree more flexible to allow for different emphases within the degree. The department is strongly encouraged to explore this possibility, and to inform students regarding different career pathways that might exist for students pursuing a Math degree. Are there trends in the job market that might influence students to move in different directions within Mathematics? | In progress  Completed  No longer applicable | See Page 2. |
| It emerged in the discussion with the Review Team that the Math Department is currently gathering a tremendous amount of data that could be used to assess general education and program outcomes. While the self-study did not contain much in the way of analysis and reporting of this data, it appears that this is occurring, and specific examples of this were shared in the Review Team meeting. As mentioned previously, the standardization of assignments and exam items places the department in a strong position for assessment work. It may be that the department is currently doing more assessment than it realizes, which would explain why more of the results of these efforts weren’t included in the self-study. The department is encouraged to formalize the collection, analysis, and reporting of this assessment data, and provide evidence of this yearly as required by Section III of the Annual Update report that is submitted to the dean and the Provost’s Office. | In progress  Completed  No longer applicable | The department does not agree that “the self-study did not contain much in the way of analysis and reporting of this data.”  We have processes in place for collecting data related to our program outcomes, and that data was reported and analyzed in our self-study. Like all departments, we will be developing processes this year and next year for collecting data related to the general education outcomes. |
| The Review Team noted that the perspective of students was not included in the self-study – what feedback does the department have from students? What are students saying about the department, and how can that be used for program improvements? The department is encouraged to collect student feedback and include student voices in the next self-study in five years. | In progress  Completed  No longer applicable | Beginning in 2015, the department chair will begin conducting exit interviews with graduating math majors so that this feedback can be collected. |

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| The Math Department offers several 5 credit hour courses that are offered as 4 credit hour courses at Wright State University (for example, Calculus I). Currently the Ohio Board of Regents is requiring Ohio public institutions to reduce the credit hours totals for their programs, and several departments have indicated that they had difficulties with reducing credit hour totals for their programs because of 5 credit hour MAT courses. Of more concern, it would seem that we place students in a situation where they will inevitably lose a credit hour when they transfer in these situations. The department is encouraged to analyze where the majority of our students will be transferring, and to seriously consider whether our students wouldn’t be better served by alignment between the number of credit hours we require for these courses and the credit hours of the transfer institutions where the greatest number of our students will be transferring. The department has a strong history of doing what is best for the student, and it is hoped that careful consideration of the credit hour question will be guided by this core value that the department holds. | In progress  Completed  No longer applicable | There are currently three programs at Sinclair which use Calculus I:   * Mathematics--MATE.S.AS (60 hours) * Chemistry--CHEE.S.AS (61 hours) * Engineering--ESUP.S.AS (60 hours)   The majority of students who take calculus at Sinclair transfer to Wright State, where the three calculus courses are each 4 credit hours rather than 5. Reducing our classes to 4 credit hours would be desirable for both math and engineering majors. The three extra hours transfer to Wright State as general elective hours. While the BS degrees in math and chemistry have plenty of room for general elective credits, the engineering degrees do not. This change would free up three credit hours, which the ESUP.S.AS program could use to add a multicultural elective, which would in turn allow engineering transfer majors to complete more of Wright State’s Core Curriculum as part of their Sinclair degree.  This reduction in credit hours would also benefit the math program, as it would free three credit hours which could be used to add a new course to the MATE.S.AS degree. When we sat down with Wright State to work on our articulation agreements, the only problem they noted was that we lacked an equivalent for their MTH 2800—Writing Mathematical Proofs. This course is ordinarily taken by WSU students during the second semester of their second year, in order to prepare for a sequence taken the junior year which has MTH 2800 as a prerequisite. WSU only offers this class in the spring semester, and we believe that if we offered it in the summer, a combination of our native students and WSU transient students would make it a viable offering.  However, there is one problem. Like UD, Wright State was only able to convert their calculus classes from five credit hours to four credit hours by reorganizing these classes into a three hours lecture with two hours of lab format. The content of the Calculus sequence requires five contact hours per week. However, some of the concepts taught could be covered through lab activities that would take place in a computer lab where students have access to software such as Mathematica or Maple. That is how Wright State and UD do it.  In order for the Math Department to move in this direction, we would need a dedicated, 30-seat computer lab for calculus classes (comparable to what Wright State has), along with 30 student licenses for Mathematica or Maple (which would cost about $3000 per year).  There is a complication with this request. The Math Department currently has three dedicated computer labs:   * 13-121 (used for Quantway classes) * 10-311 (used for statistics classes) * 11-442 (used for tech math and statistics classes)   We expect to lose two of these three rooms to expansion projects taking place in Buildings 10 and 13 next year. So, we already need the college to allocate two more dedicated computer labs for the Math Department. A change in the Calculus curriculum would increase that request to three dedicated computer labs. |

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| While not discussed in the meeting with the department, in their subsequent meeting the Review Team wondered whether it might be worthwhile to re-examine the “one-year rule” that requires students to re-take MAT courses if more than a year has passed before progressing to the next MAT course. Initially the department did a superb job of using data to inform the change – does data still support the effectiveness of this policy, particularly given the change to semesters in the years since? The department may want to explore the option of requiring students to take a short refresher course rather than requiring them to re-take the entire semester-long MAT course. | In progress  Completed  No longer applicable | The one-year time limit policy on prerequisites for MAT courses has a one-time waiver built into it that makes the concern expressed here unnecessary. If a student has already used their waiver, they can still take the placement test.  A deficiency of Accuplacer is that it provides no feedback, to the student or the college, on what content the student had trouble with on the test. MyMathTest, which is the alternative placement product which we are currently piloting, does not share this deficiency. It generates a study plan which students can access from home after they complete their placement test. The study plan focuses on material that the student did not test well on, so that the student can prepare for retaking the placement test.  The one-year rule has done a good job of doing what it was designed to do. Prior to its implementation, virtually every MAT class contained students who were taking the class for the fifth time or more. When a student has been unsuccessful in a class once or twice, it is plausible that unexpected circumstances in their personal life were to blame. When a student has been unsuccessful four or more times, there are only two explanations:   1. There is a large deficiency in their knowledge of the prerequisite material. 2. Some permanent aspect of their personal life is preventing them from being successful.   The second problem cannot be dealt with in any readily apparent manner, but the first one can be. It can be addressed by having the student retake the placement test and start over in a course that they are ready to take. The one-year rule makes it impossible for a student to take a class unsuccessfully more than three times before being required to retake the placement test.  The problem of students taking a class unsuccessfully more than three times appears to have been completely solved by the one-year rule. It therefore has had a huge positive effect. Furthermore, it has no conceivable negative effect. Any student who has allowed more than one year to lapse between math courses, but is still genuinely prepared to take the next class, is covered by the waiver. If they have used the waiver previously, then at worst they will only have to take the placement test. |

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| Please respond to the following items regarding external program accreditation. | |
| **Date of Most Recent Program Accreditation Review** | Date of most recent accreditation review: \_\_\_\_\_\_\_\_\_\_\_\_\_  **OR**  Programs in this department do not have external accreditation |
| **Please describe any issues or recommendations from your last accreditation review (if applicable)** |  |
| **Please describe progress made on any issues or recommendations from your last accreditation review (if applicable)** |  |

**Section III: Assessment of General Education & Degree Program Outcomes**

The Program Outcomes for the degrees are listed below. **All program outcomes must be assessed at least once during the 5 year Program Review cycle, and assessment of program outcomes must occur each year**.

**PLEASE NOTE – FOR THE NEXT TWO YEARS, GENERAL EDUCATION OUTCOME ASSESSMENT WILL BE TEMPORARILY POSTPONED. WE WOULD ASK THAT IN THIS ANNUAL UPDATE YOU IDENTIFY AT LEAST ONE COURSE IN YOUR DEGREE PROGRAM(S) WHERE ASSESSEMENT AT THE MASTERY LEVEL WILL OCCUR FOR THE FOLLOWING THREE GENERAL EDUCATION OUTCOMES:**

* **CRITICAL THINKING/PROBLEM SOLVING**
* **INFORMATION LITERACY**
* **COMPUTER LITERACY**

**NOTE THAT THERE WILL NEED TO BE AT LEAST ONE EXAM / ASSIGNMENT / ACTIVITY IN THIS COURSE THAT CAN BE USED TO ASSESS MASTERY OF THE COMPETENCY.**

**YOU MAY ALSO SUBMIT ASSESSMENT RESULTS FOR THESE GENERAL EDUCATION COMPETENCIES IF YOU HAVE THEM, BUT IT WILL BE CONSIDERED OPTIONAL**.

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| **General Education Outcomes** | To which degree(s) is this program outcome related? | Year courses identified where mastery of general education competency will be assessed. | PLEASE INDICATE AT LEAST ONE COURSE WHERE MASTERY OF THE COMPETENCY WILL BE ASSESSED FOR EACH OF YOUR DEGREE PROGRAMS | What were the assessment results for this General Education competency?  (Please provide brief summary data)  **NOTE: - THIS IS OPTIONAL FOR THE FY 2014-15 AND FY 2015-16 ANNUAL UPDATES** |
| Critical Thinking/Problem Solving | | All programs | **2014-2015** | MAT 2280 |  |
| Information Literacy | | All programs | **2014-2015** | PHY 2201 |  |
| Computer Literacy | | All programs | **2014-2015** | MAT 2290 |  |
| Values/Citizenship/Community | | All programs | **2015-2016** | Due in FY 2015-16 |  |
| Oral Communication | | All programs | **N/A** | COM 2206/2211 |  |
| Written Communication | | All programs | **N/A** | ENG 1101 |  |
| Are changes planned as a result of the assessment of general education outcomes? If so, what are those changes | | **OPTIONAL FOR FY 2014-15** | | | |
| How will you determine whether those changes had an impact? | | **OPTIONAL FOR FY 2014-15** | | | |

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| **Program Outcomes** | To which course(s) is this program outcome related? | Year assessed or to be assessed. | Assessment Methods  Used | What were the assessment results?  (Please provide brief summary data) |
| Effectively communicate mathematical concepts using correct terminology and notation. | MAT 2270 | Every year | Beginning and End-of-Semester written assignments. | In 2014, 28% of students who took MAT 2270 in the fall or spring showed improvement at the end of the semester when compared to the beginning of the semester. |
| Demonstrate critical thinking and problem solving by using calculus to solve application problems. | MAT 2280 | Every year | Common Final Exam Question, with Common Grading Rubric | The common final exam problem was evaluated for 9 criteria. Of the nine, the result that was the most concerning was that only 31% of students used appropriate upper and lower limits of integration. Identifying appropriate limits of integration is key to using the material in MAT 2280 to solve science and engineering problems. |
| Effectively communicate a mathematical proof orally to a varied audience. | MAT 2320 | Every year | Oral Presentation | The average score on the oral presentation for students who took MAT 2320 in 2014 was 81%. We will use this number as a benchmark for comparison in future years. |

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| **Are changes planned as a result of the assessment of program outcomes? If so, what are those changes?** | The results of the common final exam question in MAT 2280 will be communicated to all calculus instructors so that greater emphasis may be placed on the weakest areas. |
| **How will you determine whether those changes had an impact?** | We will continue to collect data as we have been. |

**APPENDIX – PROGRAM COMPLETION AND SUCCESS RATE DATA**

**Degree and Certificate Completion**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Division | Department | Department Name | Program | FY 07-08 | FY 08-09 | FY 09-10 | FY 10-11 | FY 11-12 | FY 12-13 | FY 13-14 |
| SME | 0351 | Mathematics | MATE.AS | 7 | 4 | 5 | 4 | 4 | 5 | 2 |
| SME | 0351 | Mathematics | MATE.S.AS | . | . | . | . | . | . | 4 |

**Course Success Rates**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Department** | **Department Name** | **Course** |  | **FY 07-08** | **FY 08-09** | **FY 09-10** | **FY 10-11** | **FY 11-12** | **FY 12-13** | **FY 13-14** |
| 0351 | Mathematics | MAT-101 |  | 48.7% | 45.6% | 46.6% | 47.0% | 48.8% | . | . |
| 0351 | Mathematics | MAT-102 |  | 48.2% | 49.0% | 47.0% | 50.2% | 50.5% | 43.6% | . |
| 0351 | Mathematics | MAT-105 |  | 55.0% | 55.0% | 53.2% | 50.1% | 51.9% | 70.9% | . |
| 0351 | Mathematics | MAT-106 |  | 72.9% | 73.6% | 69.1% | 70.7% | 71.8% | 67.9% | . |
| 0351 | Mathematics | MAT-108 |  | 71.8% | 68.9% | 73.6% | 76.4% | 75.4% | 92.6% | . |
| 0351 | Mathematics | MAT-109 |  | 94.5% | 88.7% | 92.0% | 88.1% | 83.7% | . | . |
| 0351 | Mathematics | MAT-1110 |  | . | . | . | . | . | 60.2% | 63.9% |
| 0351 | Mathematics | MAT-1120 |  | . | . | . | . | . | 48.9% | 56.9% |
| 0351 | Mathematics | MAT-1130 |  | . | . | . | . | . | 71.5% | 67.2% |
| 0351 | Mathematics | MAT-114 |  | . | . | . | . | 69.4% | . | . |
| 0351 | Mathematics | MAT-116 |  | 59.0% | 59.5% | 56.5% | 57.8% | 60.3% | 66.5% | . |
| 0351 | Mathematics | MAT-117 |  | 58.1% | 70.0% | 69.4% | 62.3% | 59.1% | 90.2% | . |
| 0351 | Mathematics | MAT-121 |  | 54.8% | 55.9% | 56.4% | 54.3% | 60.6% | 63.2% | . |
| 0351 | Mathematics | MAT-122 |  | 72.9% | 73.0% | 74.3% | 69.4% | 70.1% | 73.5% | . |
| 0351 | Mathematics | MAT-1270 |  | . | . | . | . | . | 51.9% | 52.3% |
| 0351 | Mathematics | MAT-1280 |  | . | . | . | . | . | 63.6% | 64.5% |
| 0351 | Mathematics | MAT-1290 |  | . | . | . | . | . | 57.7% | 63.3% |
| 0351 | Mathematics | MAT-1295 |  | . | . | . | . | . | 50.0% | . |
| 0351 | Mathematics | MAT-131 |  | 59.6% | 73.1% | 57.7% | 70.0% | 68.0% | . | . |
| 0351 | Mathematics | MAT-132 |  | 54.1% | 58.0% | 63.4% | 61.9% | 73.8% | . | . |
| 0351 | Mathematics | MAT-133 |  | 65.4% | 53.7% | 61.8% | 70.1% | 53.1% | 50.0% | . |
| 0351 | Mathematics | MAT-1340 |  | . | . | . | . | . | 58.8% | 72.4% |
| 0351 | Mathematics | MAT-1355 |  | . | . | . | . | . | 82.9% | 65.8% |
| 0351 | Mathematics | MAT-1365 |  | . | . | . | . | . | 76.8% | 67.7% |
| 0351 | Mathematics | MAT-1370 |  | . | . | . | . | . | 55.7% | 55.2% |
| 0351 | Mathematics | MAT-141 |  | 94.0% | 94.1% | 81.6% | 76.1% | 82.5% | . | . |
| 0351 | Mathematics | MAT-1410 |  | . | . | . | . | . | 97.0% | 88.0% |
| 0351 | Mathematics | MAT-142 |  | 72.0% | 84.1% | 93.8% | 100.0% | 73.1% | . | . |
| 0351 | Mathematics | MAT-1420 |  | . | . | . | . | . | 75.0% | 75.0% |
| 0351 | Mathematics | MAT-143 |  | 100.0% | 87.0% | 56.7% | 91.2% | 86.1% | . | . |
| 0351 | Mathematics | MAT-1430 |  | . | . | . | . | . | 93.3% | 100.0% |
| 0351 | Mathematics | MAT-1440 |  | . | . | . | . | . | 70.6% | 66.9% |
| 0351 | Mathematics | MAT-1450 |  | . | . | . | . | . | 91.7% | 82.1% |
| 0351 | Mathematics | MAT-1460 |  | . | . | . | . | . | 56.5% | 54.4% |
| 0351 | Mathematics | MAT-1470 |  | . | . | . | . | . | 49.5% | 50.0% |
| 0351 | Mathematics | MAT-1570 |  | . | . | . | . | . | 53.3% | 66.7% |
| 0351 | Mathematics | MAT-1580 |  | . | . | . | . | . | 65.6% | 47.6% |
| 0351 | Mathematics | MAT-191 |  | 53.7% | 61.1% | 53.0% | 50.2% | 49.9% | . | . |
| 0351 | Mathematics | MAT-192 |  | 58.6% | 46.4% | 57.0% | 53.8% | 47.4% | 50.0% | . |
| 0351 | Mathematics | MAT-193 |  | 60.6% | 57.0% | 58.3% | 54.7% | 55.1% | 80.0% | . |
| 0351 | Mathematics | MAT-201 |  | 54.3% | 53.7% | 57.3% | 62.5% | 61.4% | 76.5% | . |
| 0351 | Mathematics | MAT-202 |  | 64.3% | 57.0% | 58.9% | 64.3% | 61.1% | . | . |
| 0351 | Mathematics | MAT-203 |  | 67.2% | 54.6% | 76.6% | 68.9% | 72.5% | 91.7% | . |
| 0351 | Mathematics | MAT-204 |  | 73.0% | 72.4% | 73.5% | 75.9% | 78.2% | 83.3% | . |
| 0351 | Mathematics | MAT-215 |  | 69.8% | 78.6% | 61.4% | 73.1% | 82.5% | 30.8% | . |
| 0351 | Mathematics | MAT-216 |  | 81.5% | 72.6% | 72.7% | 67.8% | 83.3% | 73.9% | . |
| 0351 | Mathematics | MAT-2160 |  | . | . | . | . | . | 64.3% | 66.0% |
| 0351 | Mathematics | MAT-2170 |  | . | . | . | . | . | 65.7% | 73.7% |
| 0351 | Mathematics | MAT-218 |  | 58.5% | 71.4% | 59.2% | 59.5% | 68.3% | 67.6% | . |
| 0351 | Mathematics | MAT-2180 |  | . | . | . | . | . | 70.8% | 79.0% |
| 0351 | Mathematics | MAT-220 |  | 77.2% | 73.8% | 73.9% | 73.3% | 76.0% | 65.0% | . |
| 0351 | Mathematics | MAT-2270 |  | . | . | . | . | . | 52.3% | 59.3% |
| 0351 | Mathematics | MAT-2280 |  | . | . | . | . | . | 62.7% | 63.4% |
| 0351 | Mathematics | MAT-2290 |  | . | . | . | . | . | 79.2% | 74.5% |
| 0351 | Mathematics | MAT-2310 |  | . | . | . | . | . | 81.8% | 82.5% |
| 0351 | Mathematics | MAT-2320 |  | . | . | . | . | . | 81.8% | 77.4% |
| 0351 | Mathematics | MAT-2330 |  | . | . | . | . | . | 74.1% | 69.0% |
| 0351 | Mathematics | MAT-297 |  | 33.3% | 40.0% | 100.0% | . | 75.0% | . | . |
| 0351 | Mathematics | MAT-901 |  | . | . | . | . | 45.9% | 57.6% | . |
| 0351 | Mathematics | MAT-902 |  | . | . | . | . | . | 82.4% | . |
| 0351 | Mathematics | MAT-9202 |  | . | . | . | . | . | 55.2% | . |