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| jscc logo | **Assessment Record** |

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| **Program:** | **Mathematics, Engineering, Physical Sciences** | **Assessment period:** | **Fall 2016 – Spring 2017** |

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| |  | | --- | | **Program or Department Mission:** |   The Department of Mathematics/Engineering/Physical Sciences offers a broad range of courses that service the career programs of the college and that will transfer to baccalaureate degree granting institutions. The department also offers developmental mathematics courses to prepare students for college level mathematics. |

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| **Instructional Program Outcomes & Assessment Plan - MTH 090**  **Mathematics Course Level Outcomes Assessment Rubric**  Level 4: Student provides a complete and correct solution process that is well organized, with no errors.  Level 3: Student provides a complete solution process that is well organized, but contains minor errors.  Level 2: Student demonstrates understanding of methods required to produce a correct solution, but the solution process lacks expected organization and/or contains errors deemed more significant.  Level 1:  Student attempts a solution, but demonstrates little understanding of methods required to produce a correct solution with expected organization.  Level 0: Student does not attempt a solution.  **General Education Objective:**  Students will use abstract ideas, symbols, and fundamental skills of mathematics to analyze and solve problems.  **Evaluated Course Objectives:**  The student will demonstrate his/her ability to make very basic applications of the arithmetic and algebraic skills taught in this course by being able to:  1. Express any given composite number in its prime factored form.  2. Apply the order of operations agreement to computations involving more than one operation.  3. Evaluate algebraic expressions using given numerical values. | | | | |
| **Intended Outcomes** | **Means of Assessment** | **Criteria for Success** | **Summary & Analysis of Assessment Evidence** | **Use of Results** |
| MTH 090 Objective 1  The student will demonstrate his/her ability to make very basic applications of the arithmetic and algebraic skills taught in this course by being able to express any given composite number in its prime factored form. | Rubric based assessment of related common final exam problems | 70% of students learning at a rubric level of 2 or higher | Level 4: 63/130 = 48.5% Jefferson  15/37=40.5% Shelby  30/50 =60% Clanton  17/22 =77.3% Pell City    Level 3: 9/130 = 6.9% Jefferson  11/37=29.7% Shelby  12/50=24% Clanton  0/22 = 0% Pell City    Level 2: 15/130 =11.5% Jefferson  3/37=8.1% Shelby  3/50=6% Clanton  3/22 = 13.5% Pell City    Level 1: 15/130 = 11.5% Jefferson  8/37=21.6% Shelby  2/50=4% Clanton  2/22 = 9% Pell City  Level 0: 28/130=21.5% Jefferson  0/37=0%Shelby  3/50=6% Clanton 0/22 = 0% Pell City  75.7% of all students are performing at Level 2 or higher  Jefferson: 66.9% at level 2 or higher  Shelby: 78.4% at level 2 or higher  Clanton:90% at level 2 or higher  Pell City: 91% at level 2 or higher | Our goal of 70% was exceeded considerably. When comparing last year’s results to this year, there is a minimal increase in the number of students who performed at level 2 or higher for objective 2 and a slight decrease in the number of students who performed at level 2 or higher for objectives 1 and 3.  The plan is to continue current instructional methods and also continue to offer free tutoring at each campus. Students are taking advantage of the free tutoring service and hopefully we will continue to exceed our goal. |
| MTH 090 Objective 2  The student will demonstrate his/her ability to make very basic applications of the arithmetic and algebraic skills taught in this course by being able to apply the order of operations agreement to computations involving more than one operation. | Rubric based assessment of related common final exam problems | 70% of students learning at a rubric level of 2 or higher | Level 4:50/130 =38.5% Jefferson  12/37=32.4% Shelby  17/50=34% Clanton  8/22 =36.4% Pell City  Level 3:32/130=24.6% Jefferson  11/37= 29.7% Shelby  23/50=46% Clanton  6/22 =27.3% Pell City  Level 2: 19/130 =14.6% Jefferson  9/37=24.3% Shelby  7/50=14% Clanton  5/22=22.7% Pell City  Level 1: 15/130=11.5% Jefferson  5/37=13.5% Shelby  3/50=6% Clanton  3/22 =13.6% Pell City    Level 0: 14/130 =10.8% Jefferson  0/37 = 0% Shelby  0/50=0% Clanton  0/22 = 0% Pell City  83.3% of all students are performing at Level 2 or higher  Jefferson: 77.7% at level 2 or higher  Shelby: 86.5% at level 2 or higher  Clanton: 94% at level 2 or higher  Pell City: 86.4% at level 2 or higher | Note there is a slight increase (0.4%) in the number of students performing at level 2 or higher for objective 2 compared to last year. Note that the percent of students achieving at level 2 or higher still far exceeds the goal of 70%. The plan is to continue current instructional methods and also continue to offer free tutoring at each campus. |
| MTH 090 Objective 3  The student will demonstrate his/her ability to make very basic applications of the arithmetic and algebraic skills taught in this course by being able to evaluate algebraic expressions using given numerical values. | Rubric based assessment of related common final exam problems | 70% of students learning at a rubric level of 2 or higher | Level 4:61/130 =46.9% Jefferson  16/37=43.2% Shelby  21/50=42% Clanton  14/19=73.7% Pell City    Level 3:24/130 =18.5% Jefferson  9/37=24.3% Shelby  13/50=26% Clanton  1/19 = 5.3% Pell City  Level 2:22/130=16.9% Jefferson  6/37=16.2% Shelby  13/50= 26% Clanton  3/19 = 15.8% Pell City  Level 1:11/130=8.5% Jefferson  6/37=16.2% Shelby  1/50= 2% Clanton  1/19 = 5.3% Pell City  Level 0:12/130=9.2% Jefferson  0/37=0% Shelby  2/50 = 4% Clanton  0/19 = 0% Pell City    86% of all students are performing at Level 2 or higher  Jefferson: 82.3% at level 2 or higher  Shelby: 83.8% at level 2 or higher  Clanton: 94% at level 2 or higher  Pell City: 94.7% at level 2 or higher | Again, our goal of 70% of students learning at a rubric level of 2 or higher is exceeded considerably. We will continue current instructional methods and continue to offer free tutoring at each campus. |

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| **Instructional Program Outcomes & Assessment Plan - MTH 098**  **Mathematics Course Level Outcomes Assessment Rubric**  Level 4: Student provides a complete and correct solution process that is well organized, with no errors.  Level 3: Student provides a complete solution process that is well organized, but contains minor errors.  Level 2: Student demonstrates understanding of methods required to produce a correct solution, but the solution process lacks expected organization and/or contains errors deemed more significant.  Level 1:  Student attempts a solution, but demonstrates little understanding of methods required to produce a correct solution with expected organization.  Level 0: Student does not attempt a solution.  **General Education Objective**  Students will use abstract ideas, symbols, and fundamental skills of mathematics to analyze and solve problems.  **Evaluated Course Objectives**  The student will demonstrate his/her understanding of algebraic manipulations, interpretations, and computations by being able to:  1. Solve linear equations, including literal, by applying the properties of equality.  2. Apply the rules of exponents to quantities involving integer exponents.  3. Graph a linear equation.  4. Factor a trinomial. | | | | |
| **Intended Outcomes** | **Means of Assessment** | **Criteria for Success** | **Summary & Analysis of Assessment Evidence** | **Use of Results** |
| MTH 098 Objective 1  The student will demonstrate his/her understanding of algebraic manipulations, interpretations, and computations by being able to solve linear equations, including literal, by applying the properties of equality. | Rubric based assessment of related common final exam problems | 70% of students learning at a rubric level of 2 or higher | Level 4:Jefferson-82/221=37.1%  Shelby: 122/229=53.3%  Clanton:31/66=47%  Pell City: 21/37=56.8%    Level 3: Jefferson-57/221=25.8%  Shelby-33/229=14.4%  Clanton-22/66=33.3%  Pell City-8/37=21.6%    Level 2:Jefferson-43/221=19.5%  Shelby-28/229=12.2%  Clanton-7/66=10.6%  Pell City-1/37=2.7%    Level 1:Jefferson-25/221=11.3%  Shelby -37/229=16.2%  Clanton-5/66=7.6%  Pell City-6/37=16.2%    Level 0:Jefferson-14/221=6.3%  Shelby-10/229=4.4%  Clanton-1/66=1.5%  Pell City -1/37=2.7%    Total number of students learning at level 2 or higher: 455/553 =82.3%  Jefferson: 82.4% at level 2 or higher  Shelby: 80% at level 2 or higher  Clanton: 90.9% at level 2 or higher  Pell City: 81.1% at level 2 or higher | The course content for MTH 098 was changed this year, therefore, 2 of our objectives changed as well. The goal of 70% of students learning at a level of 2 or higher was considerably exceeded for Objectives 1 and 2; however, the level of mastery for objectives 3 and 4 (new objectives) fell short of the 70% goal.  The plan is to continue current instructional methods and also continue to offer free tutoring at each campus. |
| MTH 098 Objective 2  The student will demonstrate his/her understanding of algebraic manipulations, interpretations, and computations by being able to apply rules of exponents to quantities involving integer exponents. | Rubric based assessment of related common final exam problems | 70% of students learning at a rubric level of 2 or higher | Level 4:Jefferson-71/221=32.1%  Shelby-59/229=25.8%  Clanton-25/66=37.9%  Pell City -8/37=21.6%    Level 3:Jefferson-50/221=22.6%  Shelby-57/229=24.9%  Clanton-15/66=22.7%  Pell City -10/37=27%    Level 2:Jefferson-58/221=26.2%  Shelby-41/229=17.9%  Clanton-19/66=28.8%  Pell City -4/37=10.8%  Level 1:Jefferson-23/221=10.4%  Shelby-62/229=27.1%  Clanton=6/66=9%  Pell City -14/37=37.8%    Level 0:Jefferson-19/221=8.6%  Shelby-10/229=4.4%  Clanton-1/66=1.5%  Pell City -1/37=2.7%  Total number of students learning at level 2 or higher 417/553=75.4%  Jefferson: 81% at level 2 or higher  Shelby: 68.6% at level 2 or higher  Clanton:89.4% at level 2 or higher  Pell City: 59.5% at level 2 or higher | We will continue current instructional methods and continue to offer free tutoring at each campus. |
| MTH 098 Objective 3  The student will demonstrate his/her understanding of algebraic manipulations, interpretations, and computations by being able to graph a linear equation.  MTH 098 Objective 4  The student will demonstrate his/her understanding of algebraic manipulations, interpretations, and computations by being able to factor a trinomial.  **Submitted: 8/26/2017** | Rubric based assessment of related common final exam problems  Rubric based assessment of related common final exam problems.  **By: Nannette Easterling** | 70% of students learning at a rubric level of 2 or higher  70% of students learning at a rubric level of 2 or higher | Level 4:Jefferson-94/221=42.5%  Shelby-113/229=49.3%  Clanton-33/66=50%  Pell City -13/37=35.1%    Level 3:Jefferson-32/221=14.5%  Shelby-16/229=7%  Clanton-4/66=6%  Pell City -2/37=5.4%    Level 2:Jefferson-28/221=12.7%  Shelby-20/229=8.7%  Clanton-14/66=21.2%  Pell City-4/37=10.8%  Level 1:Jefferson-32/221=14.5%  Shelby-55/229=24%  Clanton-10/66=15.2%  Pell City-12/37=32.4%    Level 0:Jefferson-35/221=15.8%  Shelby-25/229=10.9%  Clanton-5/66=7.6%  Pell City-6/37=16.2%  Total number of students learning at level 2 or higher: 373/553=67.5%  Jefferson: 69.7% at level 2 or higher  Shelby: 65.1% at level 2 or higher  Clanton-77.3% at level 2 or higher  Pell City: 51.1% at level 2 or higher    Level 4:Jefferson-81/221=36.7%  Shelby-103/229=45%  Clanton-26/66=39.4%  Pell City -11/37=29.7%  Level 3:Jefferson-43/221=19.5%  Shelby-7/229=3.1%  Clanton-4/66=6%  Pell City -0/37=0%  Level 2:Jefferson-40/221=18.1%  Shelby-8/229=3.5%  Clanton-19/66=28.8%  Pell City -2/37=5.4%  Level 1:Jefferson-33/221=14.9%  Shelby-87/229=38%  Clanton-14/66=21.2%  Pell City -20/37=54.1%  Level 0:Jefferson-24/221=10.9%  Shelby-24/229=10.5%  Clanton-3/66=4.5%  Pell City -4/37=10.8%  Total number of students learning at level 2 or higher: 344/553=62.2%  Jefferson: 74.2% at level 2 or higher  Shelby: 51.5% at level 2 or higher  Clanton: 74.2% at level 2 or higher  Pell City: 35.1% at level 2 or higher | This objective was changed this year which may explain why 67.5% of the total number of students performed at level 2 or higher. The math department will continue to work on finding Best Practices to aid in teaching graphing of lines. There were complaints concerning a new adjunct faculty member at the end of the semester which could have played a part in the success of the students.  To aid in success and retention of students we will continue to provide free tutoring at each campus.  This objective was changed this year as well. In the past we have had an objective that required being able to factor, but the problem was not as difficult as this one. This problem requires factoring a trinomial whose leading coefficient is NOT 1. This skill is one in which students routinely struggle. Due to only 62.2% of the students learning at level 2 or higher, the math department will seek out best practices to aid in teaching this concept. We will also create a factoring worksheet to give to all MTH 098 instructors to stress the importance of this concept and to offer additional practice with the skill. We will continue to offer free tutoring at all campuses as well.  There were complaints concerning a new adjunct faculty member at the end of the semester which could have played a part in the success of the students. |

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| **Instructional Program Outcomes & Assessment Plan – MTH 100**  **Mathematics Course Level Outcomes Assessment Rubric**  Level 4: Student provides a complete and correct solution process that is well organized, with no errors.  Level 3: Student provides a complete solution process that is well organized, but contains minor errors.  Level 2: Student demonstrates understanding of methods required to produce a correct solution, but the solution process lacks expected organization and/or contains errors deemed more significant.  Level 1: Student attempts a solution, but demonstrates little understanding of methods required to produce a correct solution with expected organization.  Level 0: Student does not attempt a solution.  **General Education Objective**  Students will use abstract ideas, symbols, and fundamental skills of mathematics to analyze and solve problems.  **Department Outcomes**   * Provide freshman and sophomore-level courses in Chemistry, Mathematics, Physics, Physical Sciences, and Astronomy, with emphasis on critical thinking and analytical ability that are transferable to public institutions of higher learning. * Offer an appropriate remedial mathematics program accommodating various skill levels. * Develop and provide courses relevant to the career and professional degree programs of the college.   **Evaluated Course Objectives**  The student will demonstrate his/her understanding of algebraic manipulations, interpretations, and computations by being able to:  1. Simplify radical expressions and perform operations with radical expressions  2. Find the equation of a line given appropriate information.  3. Perform operations with rational expressions  4. Use The quadratic formula to find solutions to equations | | | | | | |
| **Intended Outcomes** | **Means of Assessment** | **Criteria for Success** | | **Summary & Analysis of Assessment Evidence** | **Use of Results** | |
| MTH 100 Objective 1  The student will demonstrate his/her understanding of algebraic manipulations, interpretations, and computations by being able to simplify radical expressions and perform operations with radical expressions | Rubric based assessment of related common final exam problems | 70% of students learning at a rubric level of 2 or higher | | **Fall Semester:**  Level 4:  12/41=56.1% (Jefferson)  58/75=77.3% (Pell City)  64/126 = 50.8% (Shelby)  57/79 = 72.2 (Clanton)  Level 3:  6/41=14.6% (Jefferson)  6/75= 8% (Pell City)  14/126 = 11% (Shelby)  10/79 = 12.7% (Clanton)  Level 2:  11/41=26.8%(Jefferson)  1/75 = 1.3% (Pell City)  19/126 = 15.1%(Shelby)  8/79 = 10.1% (Clanton)  Level 1:  7/41 = 17.1% (Jefferson)  6/75= 8% (Pell City)  15/126 = 11.9% (Shelby)  2/79 = 2.5% (Clanton)  Level 0:  5/41 = 12% (Jefferson)  4/75=5.3% (Pell City)  14/126= 11.1% (Shelby)  2/79= 2.5% (Clanton)  **Fall totals at rubric level 2 or higher:**    70.7%(Jefferson)  86.6% (Pell City)  77.0% (Shelby)  94.9% (Clanton)  **Fall total at rubric level 2 or higher (college-wide):**  266/321=82.9%  **Spring Semester:**  Level 4:  27/89 = 30.3% (Jefferson)  32/46= 69.6% (Pell City)  85/179 = 47.5% (Shelby)  46/91 = 50.5% (Clanton)  Level 3:  14/89= 15.7% (Jefferson)  3/46 = 6.5% (Pell City)  19/179 = 10.6% (Shelby)  10/91 = 11.0% (Clanton)  Level 2:  30/89 = 33.7% (Jefferson)  6/46=13% (Pell City)  16/179 =8.9% (Shelby)  21/91 = 23.1% (Clanton)  Level 1:  6/89=6.7% (Jefferson)  4/46 = 8.7% (Pell City)  43/179 = 24.0% (Shelby)  8/91 = 8.8% (Clanton)  Level 0:  12/89 = 13.5% (Jefferson)  1/46=2.2% (Pell City)  16/179 =8.9% (Shelby)  6/91 = 6.6% (Clanton)  **Spring totals at rubric level 2 or higher:**    79.7% (Jefferson)  89.1% (Pell City)  67.0% (Shelby)  84.6% (Clanton)  **Spring total at rubric level 2 or higher:**  309/405=76.3% | **Annual campus-wide total at rubric level 2 or higher:**  **575/726 = 79.2%**  There was a slight decrease in the rate of success of 2.4% compared to 2015-2016 although success rate still met the criteria for success.  Students will continue to be made aware of the availability of tutors in various ways such as email and other media outlets. | |
| MTH 100 Objective 2  The student will demonstrate his/her understanding of algebraic manipulations, interpretations, and computations by being able to find the equation of a line when given appropriate information | Rubric based assessment of related common final exam problems | 70% of students learning at a rubric level of 2 or higher | | **Fall Semester:**  Level 4:  21/41=51.2% (Jefferson)  22/75=29.3% (Pell City)  57/126 = 45.2% (Shelby)  35/79=44.3% (Clanton)  Level 3:  4/41=9.8% (Jefferson)  20/75= 26.7% (Pell City)  23/126 =18.3% (Shelby)  7/79 = 8.9% (Clanton)  Level 2:  8/41=19.5% (Jefferson)  16/75 = 21.3% (Pell City)  17/126 = 13.5% (Shelby)  29/79 = 36.7% (Clanton)  Level 1:  5/41=12.2% (Jefferson)  13/75= 17.3% (Pell City)  19/126 =15.1% (Shelby)  6/79 = 7.6% (Clanton)  Level 0:  3/41=7.3% (Jefferson)  4/75 = 5.3% (Pell City)  10/126 = 7.9% (Shelby)  2/79 = 2.5% (Clanton)  **Fall totals at rubric level 2 or higher:**    80.5% (Jefferson)  77.3% (Pell City)  77.0% (Shelby)  90.0% (Clanton)  **Fall total college-wide at rubric level 2 or higher:**  259/321 = 80.7%  **Spring Semester:**  Level 4:  23/89=25.8% (Jefferson)  8/46=17.4% (Pell City)  73/179 = 40.8% (Shelby)  37/91 = 40.7% (Clanton)  Level 3:  24/89=27% (Jefferson)  19/46=41.3% (Pell City)  18/179=10.1% (Shelby)  15/91= 16.5% (Clanton)  Level 2:  19/89=21.3 (Jefferson)  5/46=11.9% (Pell City)  39/179 = 21.8% (Shelby)  24/91 = 26.4% (Clanton)  Level 1:  19/89=21.3 (Jefferson)  13/46=28.3% (Pell City)  38/179 = 21.2% (Shelby)  14/91 = 15.4% (Clanton)  Level 0:  4/89=4.5% (Jefferson)  1/46= 1.3% (Pell City)  11/179 = 6.1% (Shelby)  1/91 = 1.1% (Clanton)  **Spring totals at rubric level 2 or higher:**    74.2% (Jefferson)  69.6% (Pell City)  72.6% (Shelby)  83.5% (Clanton)  **Spring total campus-wide at rubric level 2 or higher:**  304/405=75.1% | **Annual campus-wide total at rubric level 2 or higher:**  563/726 = 77.5%  There was a significant increase in the rate of success of 4.2 % compared to 2015-2016.  It should be noted that this overall increase was especially significant in the fall semester (up from 73.3% last year to 80.7%).  Students will continue to be made aware of the availability of tutors in various ways such as email and other media outlets. | |
| MTH 100 Objective 3  The student will demonstrate his/her understanding of algebraic manipulations, interpretations, and computations by being able to perform operations with rational expressions | Rubric based assessment of related common final exam problems | 70% of students learning at a rubric level of 2 or higher | | **Fall Semester:**  Level 4:  15/41=36.6% (Jefferson)  42/75 = 56% (Pell City)  48/126 = 38.1% (Shelby)  21/79= 26.6% (Clanton)  Level 3:  10/41=24.4% (Jefferson)  4/75= 5.3% (Pell City)  19/126 = 15.1% (Shelby)  25/79 = 31.6% (Clanton)  Level 2:  10/41=24.4(Jefferson)  4/75=5.3% (Pell City)  16/126 = 12.7% (Shelby)  27/79 = 34.2% (Clanton)  Level 1:  5/41=12.2(Jefferson)  25/75 = 33.3% (Pell City)  37/126 = 29.4% (Shelby)  3/79 = 3.8% (Clanton)  Level 0:  1/41=2.4% (Jefferson)  0/75 = 0% (Pell City)  6/126 = 4.8% (Shelby)  3/79 = 3.8% (Clanton)  **Fall totals at rubric level 2 or higher:**    85.4% (Jefferson)  66.7% (Pell City)  65.9% (Shelby)  92.4% (Clanton)  **Fall total campus-wide at rubric level 2 or higher:**  241/321 = 75.1 %  **Spring Semester:**  Level 4:  31/90=34.43% (Jefferson)  23/46 = 50% (Pell City)  84/179 = 46.9% (Shelby)  18/91 = 19.8% (Clanton)  Level 3:  25/90=27.8% (Jefferson)  7/46 = 15.2% (Pell City)  29/179 = 16.2% (Shelby)  29/91 = 31.9% (Clanton)  Level 2:  23/90=25.6 (Jefferson)  1/46 = 2.7% (Pell City)  17/179 = 9.5% (Shelby)  17/91 = 18.7% (Clanton)  Level 1:  8/90=8.9% (Jefferson)  13/46 = 28.3% (Pell City)  38/179 = 21.2% (Shelby)  19/91 = 20.9% (Clanton)  Level 0:  3/90 = 3.3% (Jefferson)  2/46=4.3% (Pell City)  11/179 = 6.1% (Shelby)  8/91 = 8.8% (Clanton)  **Spring totals at rubric level 2 or higher:**    87.8% (Jefferson)  67.4 (Pell City)  72.6% (Shelby)  70.4% (Clanton)  **Spring total campus-wide at rubric level 2 or higher:**  304/406 = 74.9% | **Annual campus-wide total at rubric level 2 or higher:**  545/727 = 75.0%  There was a significant decrease in the rate of success of 7.4% in the fall semester compared to 2015-2017. However, the decrease in the rate of success was much less (down only 2%).  This objective continues to be a challenge to most students although the success rate has met the criteria for success.  Students will continue to be made aware of the availability of tutors in various ways such as email and other media outlets. | |
| MTH 100 Objective 4  The student will demonstrate his/her understanding of algebraic manipulations, interpretations, and computations by being able to use the quadratic formula to find solutions to equations | Rubric based assessment of related common final exam problems | 70% of students learning at a rubric level of 2 or higher | | **Fall Semester:**  Level 4:  23/41=56.1% (Jefferson)  11/75=14.7% (Pell City)  44/126 = 34.9% (Shelby)  21/79 = 26.6% (Clanton)  Level 3:  7/41= 17.1% (Jefferson)  25/75 = 33.3% (Pell City)  24/126 = 19.0% (Shelby)  31/79 = 39.2% (Clanton)  Level 2:  6/41 = 12.2% (Jefferson)  9/75 = 12%(Pell City)  18/126 = 14.3% (Shelby)  22/79 = 27.8% (Clanton)  Level 1:  2/41= 4.9% (Jefferson)  20/75= 26.7% (Pell City)  34/126 = 27.0% (Shelby)  2/79 = 2.5% (Clanton)  Level 0:  4/41 = 9.8% (Jefferson)  10/75 = 13.3% (Pell City)  6/126 = 4.8% (Shelby)  3/79 = 3.8% (Clanton)  **Fall totals at rubric level 2 or higher:**    85.4% (Jefferson)  62.3% (Pell City)  68.2% (Shelby)  93.6% (Clanton)  **Fall total at rubric level 2 or higher:**  241/321 = 75.1%  **Spring Semester:**  Level 4:  24/87=27.6% (Jefferson)  4/55 = 7.3% (Pell City)  86/179 = 48.0% (Shelby)  28/91 = 30.8% (Clanton)  Level 3:  22/87 = 25.3% (Jefferson)  10/55 = 18.2% (Pell City)  18/179 = 10.1% (Shelby)  29/91 = 31.9% (Clanton)  Level 2:  20/87= 23% (Jefferson)  5/55 = 9.1% (Pell City)  24/179 = 13.4% (Shelby)  25/91 = 27.5% (Clanton)  Level 1:  13/87= 14.9 (Jefferson)  22/55 = 40.0% (Pell City)  42/179 = 23.5% (Shelby)  6/91 = 6.6% (Clanton)  Level 0:  8/87=9.2% (Jefferson)  14/55 = 25.5% (Pell City)  9/179 = 5.0% (Shelby)  3/91 = 3.3% (Clanton)  **Spring totals at rubric level 2 or higher:**    80.3% (Jefferson)  54.32% (Pell City)  71.5% (Shelby)  90.2% (Clanton)  **Spring total campus-wide at rubric level 2 or higher:**  295/412 = 71.6% | **Annual campus-wide total at rubric level 2 or higher:**  536/733 = 71.6%  There was a significant decrease in the rate of success in the fall semester as compared to last fall (down from 82% to 75.1%) However, a large increase was noted in the spring semester (up from 65.9% to 71.6%) which cause an overall minimal change in the annual rate of success (down 1.5%). The criterial for success is met.  Students will continue to be made aware of the availability of tutors in various ways such as email and other media outlets. | |
| **Plan submission date: July 28, 2017** | | | | **Submitted by: Yu-ing Hargett and Rebecca Giles** | | |
| jscc logo | | | | **Assessment Record** | | |

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| **Program:** | **Mathematics, Engineering, Physical Sciences** | **Assessment period:** | **Fall 2016– Summer 2017** |

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| |  | | --- | | **Program or Department Mission:** |   The Department of Mathematics/Engineering/Physical Sciences offers a broad range of courses that service the career programs of the college and that will transfer to baccalaureate degree granting institutions. The department also offers developmental mathematics courses to prepare students for college level mathematics. |

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| **Instructional Program Outcomes & Assessment Plan – MTH 110**  **General Education Objective**  Students will use abstract ideas, symbols, and fundamental skills of mathematics to analyze and solve problems.  **Department Outcomes**   * Provide freshman and sophomore-level courses in Chemistry, Mathematics, Physics, Physical Sciences, and Astronomy, with emphasis on critical thinking and analytical ability, that are transferable to public institutions of higher learning. * Offer an appropriate remedial mathematics program accommodating various skill levels. * Develop and provide courses relevant to the career and professional degree programs of the college.   **Mathematics Course Level Outcomes Assessment Rubric**  Level 4: Student provides a complete and correct solution process that is well organized, with no errors.  Level 3: Student provides a complete solution process that is well organized, but contains minor errors.  Level 2: Student demonstrates understanding of methods required to produce a correct solution, but the solution process lacks expected organization and/or contains errors deemed more significant.  Level 1: Student attempts a solution, but demonstrates little understanding of methods required to produce a correct solution with expected organization.  Level 0: Student does not attempt a solution.  **Evaluated Course Objectives**  The student will demonstrate understanding of concepts, develop competent skills, and demonstrate applications by his/her ability to  1. Perform basic algebraic operations on matrices  2. Use Venn diagram to solve a problem  3. Use Bayes’ Theorem to solve a problem  4. Compute the mean, variance, and standard deviation of a random variable |

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| **Intended Outcomes** | **Means of Assessment** | **Criteria for Success** | **Summary & Analysis of Assessment Evidence**  **Note: Course is not offered at unlisted campuses.** | **Use of Results** |
| MTH 110 Objective 1  The student will demonstrate understanding of concepts, develop competent skills, and demonstrate applications by his/her ability to perform basic algebraic operations on matrices | Rubric based assessment of related common final exam problems | 70% of students learning at a rubric level of 2 or higher | **Jefferson Campus**  Level 4 13/38 34.2%  Level 3 9/38 23.7%  Level 2 11/38 28.9%  Level 1 2/38 5.3%  Level 0 3/38 7.9%  **Shelby Campus**  Level 4 29/46 63.0%  Level 3 8/46 17.4%  Level 2 2/46 4.3%  Level 1 5/46 10.9%  Level 0 2/46 4.3%  **Clanton Campus**  Level 4 10/13 76.9%  Level 3 2/13 15.4%  Level 2 1/13 7.7%  Level 1 0/13 0%  Level 0 0/13 0%  **Online**  Level 4 59/62 95.2%  Level 3 2/62 3.2%  Level 2 0/62 0%  Level 1 1/62 1.6%  Level 0 0/62 0% | Overall, 91.8% of students assessed are learning at level 2 or higher indicating success in objective 1 concept instruction. There was a slight decrease from the previous year (down 4%).  Continue current instructional methods which included in-class lectures and practice problems for on-campus sections and Power Point lessons as well as numerous written and video examples for online sections |
| MTH 110 Objective 2  The student will demonstrate understanding of concepts, develop competent skills, and demonstrate applications by his/her ability to use Venn diagram to solve a problem | Rubric based assessment of related common final exam problems | 70% of students learning at a rubric level of 2 or higher | **Jefferson Campus**  Level 4 16/38 42.1%  Level 3 6/38 15.8%  Level 2 7/38 18.4%  Level 1 5/38 13.2%  Level 0 4/38 10.5%  **Shelby Campus**  Level 4 34/46 73.9%  Level 3 1/46 2.2%  Level 2 5/46 10.9%  Level 1 6/46 13.0%  Level 0 0/46 0%  **Clanton Campus**  Level 4 7/13 53.8%  Level 3 1/13 7.7%  Level 2 4/13 10.8%  Level 1 1/13 7.7%  Level 0 0/13 0%  **Online**  Level 4 44/62 71.0%  Level 3 2/62 3.2%  Level 2 6/62 9.7%  Level 1 9/62 14.5%  Level 0 1/62 1.6% | Overall, 83.6% of students assessed are learning at level 2 or higher. An increase of 2.5% from the previous year indicating success in applying the instructional changes: adding more examples and instructional videos.  Continue current instructional methods which included in-class lectures and practice problems for on-campus sections and Power Point lessons as well as numerous written and video examples for online sections |
| MTH 110 Objective 3  The student will demonstrate understanding of concepts, develop competent skills, and demonstrate applications by his/her ability to use Bayes’ Theorem to solve a problem | Rubric based assessment of related common final exam problems | 70% of students learning at a rubric level of 2 or higher | **Jefferson Campus**  Level 4 9/38 23.7%  Level 3 8/38 21.1%  Level 2 8/38 21.1%  Level 1 7/38 18.4%  Level 0 6/38 15.8%  **Shelby Campus**  Level 4 16/46 34.8%  Level 3 3/46 6.5%  Level 2 2/46 4.3%  Level 1 24/46 52.2%  Level 0 1/46 2.2%  **Clanton Campus**  Level 4 2/13 15.4%  Level 3 2/13 15.4%  Level 2 3/13 23.1%  Level 1 4/13 30.8%  Level 0 2/13 15.4%  Online  Level 4 15/62 24.2%  Level 3 10/62 16.1%  Level 2 9/62 14.5%  Level 1 27/62 43.5%  Level 0 1/62 1.6% | Overall, 54.7% of students assessed are learning at level 2 or higher indicating students’ continued difficulty in learning objective 3 concept.  The success rate is decreased slightly (4.2%) compared to the previous academic year. Online students showed most difficulty in recall necessary formulas and/or the ability to construct the required tree diagram to complete this objective. Students will be reminded to review the practice/examples and videos implemented in the online classes to help complete the objective. |
| MTH 110 Objective 4  The student will demonstrate understanding of concepts, develop competent skills, and demonstrate applications by his/her ability to compute the mean, variance, and standard deviation of a random variable | Rubric based assessment of related common final exam problems | 70% of students learning at a rubric level of 2 or higher | **Jefferson Campus**  Level 4 7/38 18.4%  Level 3 6/38 15.8%  Level 2 9/38 23.7%  Level 1 12/38 31.6%  Level 0 4/38 10.5%  **Shelby Campus**  Level 4 29/46 63.0%  Level 3 4/46 8.7%  Level 2 4/46 8.7%  Level 1 7/46 15.2%  Level 0 2/46 4.3%  **Clanton Campus**  Level 4 8/13 61.5%  Level 3 1/13 7.7%  Level 2 3/13 23.1%  Level 1 1/13 7.7%  Level 0 0/13 0%  **Online**  Level 4 37/62 59.7%  Level 3 7/62 11.3%  Level 2 8/62 12.9%  Level 1 10/62 16.1%  Level 0 0/62 0% | Overall, 77.4% of students assessed are learning at level 2 or higher (decrease of 10% from the previous year). However, the criteria for success was met in objective 4 concept instruction.  Continue current instructional methods which included in-class lectures and practice problems for on-campus sections and Power Point lessons as well as numerous written and video examples for online sections. |
| **Plan submission date: August 24, 2017** | | | **Submitted by: Yu-ing Hargett** | |

**Assessment Record**

**Program: Mathematics, Engineering, Physical Sciences Assessment period: Fall 2016 – Summer 2017**

**Program or Department Mission:**

The Department of Mathematics/Engineering/Physical Sciences offers a broad range of courses that service the career programs of the college and that will transfer to baccalaureate degree granting institutions. The department also offers developmental mathematics courses to prepare students for college level mathematics.

**Instructional Program Outcomes & Assessment Plan – MTH 112**

# Mathematics Course Level Outcomes Assessment Rubric

Level 4: Student provides a complete and correct solution process that is well organized, with no errors.

Level 3: Student provides a complete solution process that is well organized, but contains minor errors.

Level 2: Student demonstrates understanding of methods required to produce a correct solution, but the solution process lacks expected organization and/or contains errors deemed more significant.

Level 1: Student attempts a solution, but demonstrates little understanding of methods required to produce a correct solution with expected organization

Level 0: Student does not attempt a solution.

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| **Evaluated Course Objectives**  The student will demonstrate knowledge of functions and their graphs by his/her ability to   1. Find the inverse of a given function. 2. Use properties of exponents/logarithms to solve given problems. 3. Find the real zeros of a polynomial function. 4. Graph through transformation of basic functions. |

**General Education Objective**

Students will use abstract ideas, symbols, and fundamental skills of mathematics to analyze and solve problems.

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| **Intended Outcomes** | **Means of Assessment** | **Criteria for Success** | **Summary & Analysis of Assessment Evidence** | **Use of Results** |
| **Assessment of Objective 1** The student will  demonstrate knowledge of functions and their graphs by his/her ability to find the inverse of a given function. | Rubric based assessment of related common final exam problems | 70% of students learning at a rubric level of 2 or higher | **Totals for Fall - Summer**  Level 4:  51/118 = 43.2% (Jefferson) 121/157 = 77.1% (Shelby)  35/70 = 50% (Clanton) 23/59 = 39% (Pell City) 4/56 = 7.1% (Online)  Level 3:  17/118 = 14.4% (Jefferson) 1/157 = 0.6% (Shelby) 11/70 = 15.7% (Clanton) 16/59 = 27.1% (Pell City)  24/56 = 42.9% (Online)  Level 2:  15/118 = 12.7% (Jefferson) 11/157 = 7% (Shelby) 8/70 = 11.4% (Clanton) 8/59 = 13.6% (Pell City) 2/56 = 3.6% (Online)  Level 1:  24/118 = 20.3% (Jefferson) | Schoolwide 75.4% (347/460)  performed at Level 2 or higher.  This year showed an improved performance percentage, with an increase of 4.2% over last year's percentage. Instructional methods are meeting our success goal of 70%, performing Level 2 or higher. |

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|  |  |  | 15/157 = 9.6% (Shelby) 10/70 = 14.3% (Clanton) 12/59 = 20.3% (Pell City)  15/56 = 26.8% (Online)  Level 0:  11/118 = 9.3% (Jefferson) 9/157 = 5.7% (Shelby) 6/70 = 8.6% (Clanton) 0/59 = 0% (Pell City) 11/56 = 19.6% (Online)  **Total at rubric level 2 or higher:**  347/460 = 75.4% |  |
| **Assessment of Objective 2** The student will  demonstrate knowledge of functions and their graphs by his/her ability to use properties of exponents/logarithms to solve given problems. |  |  | **Totals for Fall - Summer**  Level 4:  33/118 = 28% (Jefferson) 105/157 = 66.9% (Shelby)  21/70 = 30% (Clanton) 24/34 = 70.6% (Pell City)  10/56 = 17.9% (Online)  Level 3:  15/118 = 12.7% (Jefferson) 5/157 = 3.2% (Shelby) 4/70 = 5.7% (Clanton) 5/34 = 14.7% (Pell City) 0/56 = 0% (Online)  Level 2:  27/118 = 22.9% (Jefferson) 10/157 = 6.4% (Shelby) | Schoolwide 71.7% (312/435)  performed at level 2 or higher.  Modified question this year to match the stated objective. This year showed an improved performance percentage, with an increase of 18% over last year's percentage.  Instructional methods are meeting our success goal of 70%, performing Level 2 or higher. |

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|  |  |  | 28/70 = 40% (Clanton) 2/34 = 5.9% (Pell City) 23/56 = 41.1% (Online)  Level 1:  27/118 = 22.9% (Jefferson) 32/157 = 20.4% (Shelby) 11/70 = 15.7% (Clanton) 3/34 = 8.8% (Pell City) 11/56 = 19.6% (Online)  Level 0:  16/118 = 13.6% (Jefferson) 5/157 = 3.2% (Shelby) 6/70 = 8.6% (Clanton) 0/34 = 0% (Pell City) 12/56 = 21.4% (Online)  **Total at rubric level 2 or higher:**  312/435 = 71.7% |  |
| **Assessment of Objective 3** The student will  demonstrate knowledge of functions and their graphs by his/her ability to find the zeros of a polynomial function. |  |  | **Totals for Fall - Summer**  Level 4:  22/118 = 18.6% (Jefferson) 85/157 = 54.1% (Shelby) 12/70 = 17.1% (Clanton) 27/59 = 45.8% (Pell City)  5/56 = 8.9% (Online)  Level 3:  33/118 = 28% (Jefferson) 22/157 = 14% (Shelby) 14/70 = 20% (Clanton) 21/59 = 35.6% (Pell City)  18/56 = 32.1% (Online)  Level 2:  24/118 = 20.3% (Jefferson) 12/157 = 7.6% (Shelby) 26/70 = 37.1% (Clanton) 5/59 = 8.5% (Pell City) 10/56 = 17.9% (Online)  Level 1:  24/118 = 20.3% (Jefferson) 26/157 = 16.6% (Shelby) 15/70 = 21.4% (Clanton) 6/59 = 10.2% (Pell City) 15/56 = 26.8% (Online)  Level 0:  15/118 = 12.7% (Jefferson) 12/157 = 7.6% (Shelby) 3/70 = 4.3% (Clanton) 0/59 = 0% (Pell City)  8/56 = 14.3% (Online) | Schoolwide 73.0% (336/460)  performed at Level 2 or higher.  Modified question this year to match the stated objective. This year showed an improved performance percentage, with an increase of 4% over last year's percentage.  Instructional methods are meeting our success goal of 70%, performing Level 2 or higher. |

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|  |  |  | **Total at rubric level 2 or higher:**  336/460 = 73% |  |
| **Assessment of Objective 4** The student will  demonstrate knowledge of functions and their graphs by his/her ability to graph transformations of basic functions. | Rubric based assessment of related common final exam problems | 70% of students learning at a rubric level of 2 or higher | **Totals for Fall - Summer**  Level 4:  47/118 = 39.8% (Jefferson) 113/157 = 72% (Shelby) 41/70 = 58.6% (Clanton) 40/59 = 67.8% (Pell City)  15/56 = 26.8% (Online)  Level 3:  26/118 = 22% (Jefferson) 7/157 = 4.5% (Shelby) 4/70 = 5.7% (Clanton) 14/59 = 23.7% (Pell City)  14/56 = 25% (Online)  Level 2:  24/118 = 20.3% (Jefferson) 15/157 = 9.6% (Shelby) 17/70 = 24.3% (Clanton) | Schoolwide 86.3% (397/460)  performed at Level 2 or higher.  This year showed an improved performance percentage, with an increase of 0.8% over last year's percentage. Instructional methods are meeting our success goal of 70%, performing Level 2 or higher |

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|  |  |  | 2/59 = 3.4% (Pell City) 18/56 = 32.1% (Online)  Level 1:  4/118 = 3.4% (Jefferson) 13/157 = 8.3% (Shelby) 6/70 = 8.6% (Clanton) 3/59 = 5.1% (Pell City) 5/56 = 8.9% (Online)  Level 0:  17/118 = 14.4% (Jefferson) 9/157 = 5.7% (Shelby) 2/70 = 2.9% (Clanton) 0/59 = 0% (Pell City)  4/56 = 7.1% (Online)  **Total at rubric level 2 or higher:**  397/460 = 86.3% |  |
| **Plan submission date: 8/25/2017** | | | **Submitted by: Peggy Thrasher**  **Stella Langley** | |

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| **Program:** | **Mathematics, Engineering, Physical Sciences** | **Assessment period:** | **Fall 2016-Summer 2017** |

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| **Instructional Program Outcomes & Assessment Plan – MTH 113**  **Mathematics Course Level Outcomes Assessment Rubric**  Level 4: Student provides a complete and correct solution process that is well organized, with no errors.  Level 3: Student provides a complete solution process that is well organized, but contains minor errors.  Level 2: Student demonstrates understanding of methods required to produce a correct solution, but the solution process lacks expected organization and/or contains errors deemed more significant.  Level 1: Student attempts a solution, but demonstrates little understanding of methods required to produce a correct solution with expected organization.  Level 0: Student does not attempt a solution.  **General Education Objective**  Students will use abstract ideas, symbols, and fundamental skills of mathematics to analyze and solve problems.  **Evaluated Course Objectives**  The student will demonstrate understanding of concepts, develop competent skills, and demonstrate applications by his/her ability to  1. Graph a given trigonometric function  2. Find the values for trigonometric functions using a right triangle.  3. Perform algebraic operations on vectors.  4. Convert and use the trigonometric form of a complex number.  5. Convert an equation from polar form to rectangular form. |

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| **Intended Outcomes** | **Means of Assessment** | **Criteria for Success** | **Summary & Analysis of Assessment Evidence** | **Use of Results** |
| MTH 113 Objective 1  Graph a given trigonometric function | Rubric based assessment of related common test problems | 70% of students learning at a rubric level of 2 or higher | Jefferson  Level 4: 10/15  Level 3: 3/15  Level 2: 2/15  Level 1: 0/15  Level 0: 0/15  Clanton  Level 4: 1/9  Level 3: 0/9  Level 2: 3/9  Level 1: 1/9  Level 0: 4/9  Shelby  Level 4: 49/104  Level 3: 23/104  Level 2: 7/104  Level 1: 23/104  Level 0: 2/104 | 98/127 76.6% of students performed at level 2 or above. This is a topic that most students struggle with because translating trigonometric functions seems different from translating functions reviewed in previous courses. Our suggestion is practice. We could have review questions on every test, that forces our students to see the topic over and over again. We cannot spend an entire semester on graphing, but we can emphasize the subject on practice tests, review days, and on every assessment. |
| MTH 113 Objective 2  Find the values for trigonometric functions using a right triangle. | Rubric based assessment of related common test problems | 70% of students learning at a rubric level of 2 or higher | Jefferson  Level 4: 9/15  Level 3: 4/15  Level 2: 2/15  Level 1: 0/15  Level 0: 0/15  Clanton  Level 4: 3/9  Level 3: 2/9  Level 2: 2/9  Level 1: 1/9  Level 0: 1/9  Shelby  Level 4: 69/104  Level 3: 10/104  Level 2: 11/104  Level 1: 14/104  Level 0: 0/104 | 112/128 87.5% of students scored at level 2 or higher. We believe that students are most familiar with triangle trigonometry in our courses. Most students scored at level 3 or 4 on this objective. This topic is generally taught at the beginning of the trigonometry course. Our suggestion is to provide practice tests for the final exam that focus heavily on topics covered in the first few months of the class. |
| MTH 113 Objective 3  Perform algebraic operations on vectors. | Rubric based assessment of related common test problems | 70% of students learning at a rubric level of 2 or higher | Jefferson  Level 4: 12/15  Level 3: 2/15  Level 2: 1/15  Level 1: 0/15  Level 0: 0/15  Clanton  Level 4: 9/9  Level 3: 0/9  Level 2: 0/9  Level 1: 0/9  Level 0: 0/9  Shelby  Level 4: 87/104  Level 3: 5/104  Level 2: 3/104  Level 1: 9/104  Level 0: 0/104 | 119/128 93% scored at level 2 or higher. 108 out of 128 students that answered this question answered it perfectly. We cannot exactly say why 20 of the students missed this question, but for this type of question the most common mistake is arithmetic. Our suggestion is to urge students to check their work on these types of questions. |
| MTH 113 Objective 4  Convert and use the trigonometric form of a complex number. | Rubric based assessment of related common test problems | 70% of students learning at a rubric level of 2 or higher | Jefferson  Level 4: 9/15  Level 3: 3/15  Level 2: 3/15  Level 1: 0/15  Level 0: 0/15  Clanton  Level 4: 1/9  Level 3: 3/9  Level 2: 3/9  Level 1: 1/9  Level 0: 1/9  Shelby  Level 4: 37/104  Level 3: 11/104  Level 2: 11/104  Level 1: 24/104  Level 0: 21/104 | 81/128 63.3% of students scored at level 2 or higher. This is the only objective that we failed to reach 70% or higher. We believe that this topic received poor results because of the number of steps that are required to successfully answer this question. Students had to change the number to polar form, raise it to a power then change it back to a standard form complex number. The question might be to difficult for what we are trying to test. Our suggestion is maybe look in to simplifying the question. |
| MTH 113 Objective 5  Convert an equation from polar form to rectangular form. | Rubric based assessment of related common final exam problems | 70% of students learning at a rubric level of 2 or higher | Jefferson  Level 4: 9/15  Level 3: 3/15  Level 2: 9/15  Level 1: 0/15  Level 0: 0/15  Clanton  Level 4: 1/9  Level 3: 1/9  Level 2: 1/9  Level 1: 5/9  Level 0: 1/9  Shelby  Level 4: 62/104  Level 3: 5/104  Level 2: 5/104  Level 1: 16/104  Level 0: 16/104 | 90/128 70.3% scored at level 3 or higher. Our suggestion is including graphing equations in polar form and the same equation in rectangular form to emphasize the relationship between the conversion. |
| **Plan submission date:** | | | **Submitted by: Corey Kline** | |

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| jscc logo | **Assessment Record** |

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| **Program:** | **Mathematics, Engineering, Physical Sciences** | **Assessment period:** | **Fall 2016 –Summer 2017** |

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| |  | | --- | | **Program or Department Mission:** |   The Department of Mathematics/Engineering/Physical Sciences offers a broad range of courses that service the career programs of the college and that will transfer to baccalaureate degree granting institutions. The department also offers developmental mathematics courses to prepare students for college level mathematics. |

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| **Instructional Program Outcomes & Assessment Plan – MTH 116**  **Mathematics Course Level Outcomes Assessment Rubric**  Level 4: Student provides a complete and correct solution process that is well organized, with no errors.  Level 3: Student provides a complete solution process that is well organized, but contains minor errors.  Level 2: Student demonstrates understanding of methods required to produce a correct solution, but the solution process lacks expected organization and/or contains errors deemed more significant.  Level 1: Student attempts a solution, but demonstrates little understanding of methods required to produce a correct solution with expected organization.  Level 0: Student does not attempt a solution.  **General Education Objective**  Students will use abstract ideas, symbols, and fundamental skills of mathematics to analyze and solve problems.  **Evaluated Course Objectives**  The student will demonstrate knowledge of functions and their graphs by his/her ability to  1. Solve a linear equation in one variable  2. Calculate the volume of a solid object or container  3. Calculate percentage | | | | | |
| **Intended Outcomes** | **Means of Assessment** | **Criteria for Success** | **Summary & Analysis of Assessment Evidence** | **Use of Results** | |
| **Assessment of Objective 1**  Solve a linear equation in one variable | Rubric based assessment of related common final exam problems | 70% of students learning at a rubric level of 2 or higher | Jefferson Campus  Level 4 8/18 44.4%  Level 3 0/18 0.00%  Level 2 5/18 27.8%  Level 1 0/18 00.0%  Level 0 5/18 27.8%  Shelby Campus  Level 4 49/69 71.0%  Level 3 0/69 00.0%  Level 2 17/69 24.6%  Level 1 0/69 00.0%  Level 0 3/69 4.4% | 90.8% (79/87) performed at Level 2 or higher. Down from 93% last year  The overall percentage of students that scored at level 2 or higher declined, and the percentage of students that scored at level 4 increased this academic year. Our recommendation is adding more examples of solving linear equations on the practice tests. | |
| **Assessment of Objective 2**  Calculate the volume of a solid object or container | Rubric based assessment of related common final exam problems | 70% of students learning at a rubric level of 2 or higher | Jefferson Campus  Level 4 05/18 27.8%  Level 3 00/18 0.00%  Level 2 06/18 33.3%  Level 1 00/18 0.00%  Level 0 07/18 38.9%  Shelby Campus  Level 4 49/69 71.0%  Level 3 0/69 00.0%  Level 2 16/ 69 23.2%  Level 1 0/69 00.0%  Level 0 04/69 5.8% | 87.4% (76/87) performed at level 2 or higher. Up from last year’s 77.5%  For our question in this learning outcome, the students still seem to have trouble memorizing the formula for the volume of the cylinder. The percentage of students that performed at level 2 or higher increased this year, but we might want to investigate giving the students formula sheets for this particular question. |
| **Assessment of Objective 3**  Calculate percentage. |  |  | Jefferson Campus  Level 4 07/18 38.9%  Level 3 0/18 00.0%  Level 2 07/18 38.9%  Level 1 0/18 00.0%  Level 0 04/18 22.2%  Shelby Campus  Level 4 45/69 65.3%  Level 3 0/69 00.0%  Level 2 20/69 28.9%  Level 1 0/69 00.0%  Level 0 04/69 25.8% | 90.8% (79/87) performed at Level 2 or higher.  This was an improvement from last year’s 84.5%, though the students still seemed to have a problem figuring out what the question was asking. We believe that incorporating more word problems into the class as a whole will further improve the student’s success on this topic. | |
| **Plan submission date: 08/23/17** | **Submitted by: K. Theodorou** | |  |  | |

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| **Program:** | **Mathematics, Engineering, Physical Sciences** | **Assessment period:** | **Fall 2016 – Summer 2017** |

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| |  | | --- | | **Program or Department Mission:** |   The Department of Mathematics/Engineering/Physical Sciences offers a broad range of courses that service the career programs of the college and that will transfer to baccalaureate degree granting institutions. The department also offers developmental mathematics courses to prepare students for college level mathematics. |

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| **Instructional Program Outcomes & Assessment Plan – MTH 120**  **General Education Objective**  Students will use abstract ideas, symbols, and fundamental skills of mathematics to analyze and solve problems.  **Department Outcomes**   * Provide freshman and sophomore-level courses in Chemistry, Mathematics, Physics, Physical Sciences, and Astronomy, with emphasis on critical thinking and analytical ability, that are transferable to public institutions of higher learning. * Offer an appropriate remedial mathematics program accommodating various skill levels. * Develop and provide courses relevant to the career and professional degree programs of the college.   **Mathematics Course Level Outcomes Assessment Rubric**  Level 4: Student provides a complete and correct solution process that is well organized, with no errors.  Level 3: Student provides a complete solution process that is well organized, but contains minor errors.  Level 2: Student demonstrates understanding of methods required to produce a correct solution, but the solution process lacks expected organization and/or contains errors deemed more significant.  Level 1: Student attempts a solution, but demonstrates little understanding of methods required to produce a correct solution with expected organization.  Level 0: Student does not attempt a solution.  **Evaluated Course Objectives**  The student will demonstrate understanding of concepts, develop competent skills, and demonstrate applications by his/her ability to  1. Find an equation of the tangent line to the graph of a given function at a specified point  2. Solve a related rates problem  3. Find the absolute extrema of a given function  4. Solve an initial value problem  5. Determine the Consumers’ and Producers’ Surplus |

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| **Intended Outcomes** | **Means of Assessment** | **Criteria for Success** | **Summary & Analysis of Assessment Evidence**  **Notes: Course is not offered at unlisted campuses** | **Use of Results** |
| MTH 120 Objective 1  The student will demonstrate understanding of concepts, develop competent skills, and demonstrate applications by his/her ability to find an equation of the tangent line to the graph of a given function at a specified point | Rubric based assessment of related common final exam problems | 70% of students learning at a rubric level of 2 or higher | |  |  |  |  | | --- | --- | --- | --- | | All Campuses | Total All Campuses | Total Percentage | Level 2 or Higher | |  |  |  |  | | L4: 18 | 39 | 46.2% | 69.3% | | L3: 3 | 39 | 7.7% |  | | L2: 6 | 39 | 15.4% |  | | L1: 12 | 39 | 30.8% |  | | L0: 0 | 39 | 0% |  | | Overall, 69.3% of students assessed are learning at level 2 or higher, a 12.1% increase from the previous year (57.2%) indicating a successful result of online course restructuring this year which included frequent online testing (weekly quizzes) in addition to regular homework requirements to strengthen student learning. The new online course format will continue through the 2016-17 school year. |
| MTH 120 Objective 2  The student will demonstrate understanding of concepts, develop competent skills, and demonstrate applications by his/her ability to solve a related rates problem | Rubric based assessment of related common final exam problems | 70% of students learning at a rubric level of 2 or higher | |  |  |  |  | | --- | --- | --- | --- | | All Campuses | Total All Campuses | Total Percentage | Level 2 or Higher | |  |  |  |  | | L4: 10 | 39 | 25.6% | 89.7% | | L3: 5 | 39 | 12.8% |  | | L2: 20 | 39 | 51.3% |  | | L1: 4 | 39 | 10.3% |  | | L0: 0 | 39 | 0% |  | | Overall, 89.7% of students assessed are learning at level 2 or higher indicating continued student success in learning objective 2 concept.  The high success rate indicates students responding positively to the current instructional methods (more homework and frequent testing to keep students on task) which will continue through the 2017-18 school year. |
| MTH 120 Objective 3  The student will demonstrate understanding of concepts, develop competent skills, and demonstrate applications by his/her ability to find the absolute extrema of a given function | Rubric based assessment of related common final exam problems | 70% of students learning at a rubric level of 2 or higher | |  |  |  |  | | --- | --- | --- | --- | | All Campuses | Total All Campuses | Total Percentage | Level 2 or Higher | |  |  |  |  | | L4: 16 | 39 | 41.0% | 76.9% | | L3: 2 | 39 | 5.1% |  | | L2: 12 | 39 | 30.8% |  | | L1: 8 | 39 | 20.5% |  | | L0: 1 | 39 | 2.6% |  | | Overall, 76.9% of students assessed are learning at level 2 or higher (up 1% from previous year) indicating continued student success in learning objective 3 concept.  The success rate indicates students responding positively to the current instructional methods (more homework and frequent testing to keep students on task) which will continue through the 2017-18 school year. |
| MTH 120 Objective 4  The student will demonstrate understanding of concepts, develop competent skills, and demonstrate applications by his/her ability to solve an initial value problem | Rubric based assessment of related common final exam problems | 70% of students learning at a rubric level of 2 or higher | |  |  |  |  | | --- | --- | --- | --- | | All Campuses | Total All Campuses | Total Percentage | Level 2 or Higher | |  |  |  |  | | L4: 14 | 39 | 35.9% | 76.9% | | L3: 11 | 39 | 28.2% |  | | L2: 5 | 39 | 12.8% |  | | L1: 8 | 39 | 20.5% |  | | L0: 1 | 39 | 2.6% |  | | Overall, 76.9% of students assessed are learning at level 2 or higher which was a decrease from the previous year (down 9.2%). However, the criterial for success was met so the success rate will be reviewed in the 2017-18 school year to see if instructional improvements are needed. |
| MTH 120 Objective 5  The student will demonstrate understanding of concepts, develop competent skills, and demonstrate applications by his/her ability to  determine the Consumers’ and Producers’ Surplus | Rubric based assessment of related common final exam problems | 70% of students learning at a rubric level of 2 or higher | |  |  |  |  | | --- | --- | --- | --- | | All Campuses | Total All Campuses | Total Percentage | Level 2 or Higher | |  |  |  |  | | L4: 13 | 38 | 34.2% | 44.8% | | L3: 2 | 38 | 5.3% |  | | L2: 2 | 38 | 5.3% |  | | L1: 21 | 38 | 55.3% |  | | L0: 0 | 38 | 0% |  | | 44.8% of students assessed are learning at level 2 or higher indicating students’ continued difficulty in learning objective 5 concept. The success rate is decreased from the previous academic year (down from 50%). However, most students demonstrated inability to recall necessary formulas to complete this objective due to fatigue since the material was presented in later chapters.  The importance of working through the related homework will be emphasized to help students better retain the formulas and complete the objective. |
| **Plan submission date: August 24, 2017** | | | **Submitted by: Yu-ing Hargett** | |

**Assessment Record**

**Program: Mathematics, Engineering, Physical Sciences Assessment period: Fall 2016 – Summer 2017**

**Program or Department Mission:**

The Department of Mathematics/Engineering/Physical Sciences offers a broad range of courses that service the career programs of the college and that will transfer to baccalaureate degree granting institutions. The department also offers developmental mathematics courses to prepare students for college level mathematics.

**Instructional Program Outcomes & Assessment Plan – MTH 227**

**Mathematics Course Level Outcomes Assessment Rubric**

Level 4: Student provides a complete and correct solution process that is well organized, with no errors.

Level 3: Student provides a complete solution process that is well organized, but contains minor errors.

Level 2: Student demonstrates understanding of methods required to produce a correct solution, but the solution process lacks expected organization and/or contains errors deemed more significant.

Level 1: Student attempts a solution, but demonstrates little understanding of methods required to produce a correct solution with expected organization.

Level 0: Student does not attempt a solution.

**General Education Objective**

Students will use abstract ideas, symbols, and fundamental skills of mathematics to analyze and solve problems.

**Evaluated Course Objectives**

The General Educational Objective is met through the course objectives which require use of mathematical concepts, notations, and manipulations necessary in students’ field of study. Student mastery of the specific course objectives that follow will be evaluated by analyzing solutions for appropriate problems from the comprehensive final exam. The final exam will not be a multiple-choice exam. Students are required to show all of their work and will be graded on the quality of their technique, notation, and accuracy.

The student will demonstrate knowledge of calculus by his/her ability to

1. Find the equation of a plane.
2. Compute the directional derivative of a function.
3. Set up and evaluate a double integral.

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| **Intended Outcomes** | **Means of Assessment** | **Criteria for Success** | **Summary & Analysis of Assessment Evidence** | **Use of Results** |
| MTH 227 Objective 1 | Rubric based assessment of related common final exam problems | 70% of students learning at a rubric level of 2 or higher | Objective 1: Response Levels  #0 / #1 / #2 / #3 / #4:  Spring 2017 - 31340/31187 0(0%)/0(0%)/2(20%)/2(20%)/6(60%)  0(0%)/0(0%)/0(0%)/1(25%)/3(75%) | More than 70% of students met the criteria for success for objective  1. We might still be able to improve the result with supplementary material. |
| The student will demonstrate knowledge of the methods presented in this course by his/her ability to find the equation of a plane. |
| Summer 2017 - 40002/40359 |
| 0(0%)/0(0%)/1(17%)/2(33%)/3(50%) |
| 2(18%)/1(9%)/1(9%)/4(37%)/3(27%) |
| Summary for the year |
| 2(7%)/1(3%)/4(13%)/9(29%)/15(48%) |

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| MTH 227 Objective 2  The student will demonstrate knowledge of the methods presented in this course by his/her ability to compute the directional derivative of a function. | Rubric based assessment of related common final exam problems | 70% of students learning at a rubric level of 2 or higher | Objective 2: Response Levels  #0 / #1 / #2 / #3 / #4:  Spring 2017 - 31340/31187 0(0%)/0(0%)/2(20%)/3(30%)/5(50%)  0(0%)/0(0%)/0(0%)/0(0%)/4(100%)  Summer 2017 - 40002/40359 0(0%)/0(0%)/1(17%)/3(50%)/2(33%)  2(18%)/0(0%)/2(18%)/5(46%)/2(18%)  Summary for the year 2(7%)/0(0%)/5(16%)/11(35%)/13(42%) | More than 70% of students met the criteria for success for objective  2. We might still be able to improve the result with supplementary material. |
| MTH 227 Objective 3 | Rubric based assessment of related common final exam problems | 70% of students learning at a rubric level of 2 or higher | Objective 3: Response Levels  #0 / #1 / #2 / #3 / #4:  Spring 2017 - 31340/31187 0(0%)/0(0%)/1(10%)/3(30%)/6(60%)  0(0%)/0(0%)/0(0%)/1(25%)/3(75%) | More than 70% of students met the criteria for success for objective  3. We might still be able to improve the result with supplementary material. |
| The student will demonstrate knowledge of the methods presented in this course by his/her ability set up and evaluate a double integral. |
| Summer 2017 - 40002/40359 |
| 0(0%)/1(17%)/1(17%)/1(17%)/3(49%) |
| 1(9%)/1(9%)/0(0%)/5(46%)/4(36%) |
| Summary for the year |
| 1(3%)/2(6%)/2(6%)/10(33%)/16(52%) |

**Assessment Record**

**Program: Mathematics, Engineering, Physical Sciences Assessment period: Fall 2016 – Summer 2017**

**Program or Department Mission:**

The Department of Mathematics/Engineering/Physical Sciences offers a broad range of courses that service the career programs of the college and that will transfer to baccalaureate degree granting institutions. The department also offers developmental mathematics courses to prepare students for college level mathematics.

**Instructional Program Outcomes & Assessment Plan – MTH 238**

**Mathematics Course Level Outcomes Assessment Rubric**

Level 4: Student provides a complete and correct solution process that is well organized, with no errors.

Level 3: Student provides a complete solution process that is well organized, but contains minor errors.

Level 2: Student demonstrates understanding of methods required to produce a correct solution, but the solution process lacks expected organization and/or contains errors deemed more significant.

Level 1: Student attempts a solution, but demonstrates little understanding of methods required to produce a correct solution with expected organization.

Level 0: Student does not attempt a solution.

**General Education Objective**

Students will use abstract ideas, symbols, and fundamental skills of mathematics to analyze and solve problems.

**Evaluated Course Objectives**

The General Educational Objective is met through the course objectives which require use of mathematical concepts, notations, and manipulations necessary in students’ field of study. Student mastery of the specific course objectives that follow will be evaluated

by analyzing solutions for appropriate problems from the comprehensive final exam. The final exam will not be a multiple choice exam. Students are required to show all of the their work and will be graded on the quality of their technique, notation, and accuracy.

The student will demonstrate knowledge of the methods presented in this course by his/her ability to

1. Use an integrating factor to solve a first order linear equation.
2. Solve second order linear homogeneous equations with constant coefficients.

3. Use the Laplace transform to solve a given initial valve problem.

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| **Intended Outcomes** | **Means of Assessment** | **Criteria for Success** | **Summary & Analysis of Assessment Evidence** | **Use of Results** |
| MTH 238 Objective 1  The student will demonstrate knowledge of the methods presented in this course by  his/her ability to use an integrating factor to solve a first order linear equation. | Rubric based assessment of related common final exam problems | 70% of students learning at a rubric level of 2 or higher | Objective 1: Response Levels  #1 / #2 / #3 / #4 / #5:  Summer 2017 - 42054/42018  0 (0%)/2 (20%)/1 (10%)/4 (40%)/3 (30%)  0 (0%)/1 (10%)/2 (20%)/3 (30%)/4 (40%)  Summary for the year  0 (0%)/3 (15%)/3 (15%)/7 (35%)/7 (35%) | More than 70% of students met the criteria for success for objective  1. We might still be able to improve the result with supplementary material. |

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| MTH 238 Objective 2  The student will demonstrate knowledge of the methods presented in this course by  his/her ability to solve second order linear homogeneous equations with constant coefficients. | Rubric based assessment of related common final exam problems | 70% of students learning at a rubric level of 2 or higher | Objective 2: Response Levels  #1 / #2 / #3 / #4 / #5:  Summer 2017 - 42054/42018  0 (0%)/2 (20%)/1 (10%)/3 (30%)/4 (40%)  0 (0%)/1 (10%)/3 (30%)/4 (40%)/2 (20%)  Summary for the year  0 (0%)/3 (15%)/4 (20%)/7 (35%)/6 (30%) | More than 70% of students met the criteria for success for objective  2. We might still be able to improve the result with supplementary material. |
| MTH 238 Objective 3  The student will demonstrate knowledge of the methods presented in this course by  his/her ability to use the Laplace transform to solve a given initial valve problem. | Rubric based assessment of related common final exam problems | 70% of students learning at a rubric level of 2 or higher | Objective 3: Response Levels  #1 / #2 / #3 / #4 / #5:  Summer 2017 - 42054/42018  0 (0%)/2 (20%)/3 (30%)/3 (30%)/2 (20%)  0 (0%)/1 (10%)/2 (20%)/4 (40%)/3 (30%)  Summary for the year  0 (0%)/3 (15%)/5 (25%)/7 (35%) /5  (25%) | More than 70% of students met the criteria for success for objective  3. We might still be able to improve the result with supplementary material. |

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| **Program:** | **Mathematics, Engineering, Physical Sciences** | **Assessment period:** | **Fall 2016 - Summer 2017** |

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| |  | | --- | | **Program or Department Mission:** |   The Department of Mathematics/Engineering/Physical Sciences offers a broad range of courses that service the career programs of the college and that will transfer to baccalaureate degree granting institutions. The department also offers developmental mathematics courses to prepare students for college level mathematics. |

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| **Instructional Program Outcomes & Assessment Plan – MTH 265**  **Mathematics Course Level Outcomes Assessment Rubric**  Level 4: Student provides a complete and correct solution process that is well organized, with no errors.  Level 3: Student provides a complete solution process that is well organized, but contains minor errors.  Level 2: Student demonstrates understanding of methods required to produce a correct solution, but the solution process lacks expected organization and/or contains errors deemed more significant.  Level 1: Student attempts a solution, but demonstrates little understanding of methods required to produce a correct solution with expected organization.  Level 0: Student does not attempt a solution.  **General Education Objective**  Students will use abstract ideas, symbols, and fundamental skills of mathematics to analyze and solve problems.  **Evaluated Course Objectives**  The General Educational Objective is met through the course objectives which require use of mathematical concepts, notations, and manipulations necessary in students’ field of study. Student mastery of the specific course objectives that follow will be evaluated  by analyzing solutions for appropriate problems from the comprehensive final exam. The final exam will not be a multiple choice exam. Students are required to show all of the their work and will be graded on the quality of their technique, notation, and accuracy. The student will demonstrate knowledge of the methods presented in this course by his/her ability to   1. Calculating variance and standard deviation for a set of sample data 2. Estimating an interval for the true mean from a set of sample data 3. Set up and conduct a statistical test for the mean |

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| **Intended Outcomes** | **Means of Assessment** | **Criteria for Success** | **Summary & Analysis of Assessment Evidence** | **Use of Results** |
| MTH 265 Objective 1  Calculating variance and standard deviation for a set of sample data | Rubric based assessment of related common final exam problems | 70% of students learning at a rubric level of 2 or higher | Shelby  Level 4 - 169/233 72.5%  Level 3 - 0/233 0.00%  Level 2 - 55/233 23.6%  Level 1 - 0/233 0.00%  Level 0 - 9/233 3.9% | 96.1% of the students that were evaluated scored at level 2 or higher. This is up from 93% success last year.  We are satisfied with the percentage of students that reached this bench mark but this number is down from the 97 % that reached the goal 2 years ago. 23.6% of the students that reached the goal scored at level 2 which is an improvement on last year’s 18% of students that performed at level 2. We piloted Hawkes learning software this Summer with the 80 students and saw great improvement in overall performance. We will assess students taking Statistics with the Hawkes software this year and decide if we will use this program for all future math 265 courses. |
| MTH 265 Objective 2  Estimating an interval for the true mean from a set of sample data | Rubric based assessment of related common final exam problems | 70% of students learning at a rubric level of 2 or higher | Shelby  Level 4 - 156/233 66.9%  Level 3 - 0/233  Level 2 - 64/233 27.5%  Level 1 - 0/233  Level 0 - 13/233 5.6% | 94.4 % of the students that were evaluated scored at level 2 or higher.  Last year the success rate was 88.8%. This is a good sign that we are going in the right direction as far as this statistics objective.  We would like to further explore using a different program, Hawkes Learning, for all statistics classes. |
| MTH 265 Objective 3  Set up and conduct a statistical test for the mean | Rubric based assessment of related common final exam problems | 70% of students learning at a rubric level of 2 or higher | Shelby  Level 4 - 176/233 75.5%  Level 3 - 0/233  Level 2 - 45/233 19.3%  Level 1 - 0/233  Level 0 - 12/233 5.2% | 94.8% of the students that were evaluated performed at level 2 or higher. There was also an improvement in performance on this objective. Last year the students performed at 89.5 % success.  We would like to further explore using a different program, Hawkes Learning, for all statistics classes. |
|  |  |  | Prepared by C.Kline and K. Theodorou |  |

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| **Program:** | **Mathematics, Engineering, Physical Sciences** | **Assessment period:** | **Fall 2016 – Summer 2017** |

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| |  | | --- | | **Program or Department Mission:** |   The Department of Mathematics/Engineering/Physical Sciences offers a broad range of courses that service the career programs of the college and that will transfer to baccalaureate degree granting institutions. The department also offers developmental mathematics courses to prepare students for college level mathematics. |

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| **Instructional Program Outcomes & Assessment Plan – PHS 111**  **Physical Science 111 Course Level Outcomes Assessment Rubric**  **For Exam and Quiz Questions**  Level 4: Student provides a correct response that is well organized – 100% credit  Level 3: Student provides a partially correct response containing well over half of the facts expected in a Level 4 response – 75% credit.  Level 2: Student provides partially correct response containing less than one half of the facts expected in a Level 4 response – 25 - 50% credit.  Level 1: Student attempts a solution, provides an incorrect response – 0% credit.  Level 0: Student does not attempt a solution.  **For Lab Reports**  Level 4: Student submits a complete report containing three well organized paragraphs and at least one digital picture of the student and the lab – 100% credit.  Level 3: Student submits a report containing less than three paragraphs, but describes the lab and its results and includes a digital picture – 75% credit.  Level 2: Student submits poorly written report and includes a digital picture – 25 - 50% credit.  Level 1: Student submits a lab report, but no digital picture – 5 points maximum.  Level 0: Student does not attempt a report – 0% credit.  **General Education Objective**  The General Educational Objective is met through the course objectives. Student mastery of the specific course objectives that follow will be evaluated by analyzing responses to appropriate questions on the comprehensive final exam, or quizzes and submitted laboratory reports.  **Evaluated Course Objectives**  The student will demonstrate knowledge of physical science using writing skills with correct grammar, spelling and punctuation by his/her ability to  1. Describe and differentiate between comets, meteors and asteroids.  2. Describe different kinds of weather fronts and their associated characteristics.  3. Demonstrate the technique for presenting and analyzing data by the submission of well written laboratory reports. | | | | | |
| **Intended Outcomes** | **Means of Assessment** | **Criteria for Success** | | **Summary & Analysis of Assessment Evidence** | **Use of Results** |
| PHS 111 Objective 1  The student will demonstrate knowledge of physical science using writing skills with correct grammar, spelling and punctuation by his/her ability to describe and differentiate between comets, meteors and asteroids | Rubric based assessment of related common final exam problems | 70% of students learning at a rubric level of 3 or higher | | |  |  | | --- | --- | | Jefferson Campus | | | Level 4 | 44 | | Level 3 | 18 | | Level 2 | 9 | | Level 1 | 7 | | Level 0 | 8 |   N = 86   |  |  | | --- | --- | | Shelby Campus | | | Level 4 | 71 | | Level 3 | 28 | | Level 2 | 17 | | Level 1 | 6 | | Level 0 | 1 |   N =123  Jefferson Campus – 72.1%  Shelby Campus – 80.5%  Overall – 77.0% Success | Overall Success – 77.0%  Student success is at an acceptable level. We plan to continue on our present course concerning this objective. |
| PHS 111 Objective 2  The student will demonstrate knowledge of physical science using writing skills with correct grammar, spelling and punctuation by his/her ability to describe different kinds of weather fronts and their associated characteristics. | Rubric based assessment of related common final exam problems | 70% of students learning at a rubric level of 3 or higher | | |  |  | | --- | --- | | Jefferson Campus | | | Level 4 | 65 | | Level 3 | 2 | | Level 2 | 6 | | Level 1 | 9 | | Level 0 | 3 |   N = 85   |  |  | | --- | --- | | Shelby Campus | | | Level 4 | 72 | | Level 3 | 24 | | Level 2 | 15 | | Level 1 | 10 | | Level 0 | 3 |   N =123  Jefferson Campus – 78.8%  Shelby Campus –78.0%  Overall –78.4% Success | Overall success – 78.4%  Student success is at an acceptable level. We plan to continue on our present course concerning this objective. |
| PHS 111 Objective 3  The student will demonstrate knowledge of physical science using writing skills with correct grammar, spelling and punctuation by his/her ability to demonstrate the technique for presenting and analyzing data by the submission of well written laboratory reports. | Rubric based assessment of submitted lab reports for a common laboratory assignment. | 70% of students learning at a rubric level of 3 or higher | | |  |  | | --- | --- | | Jefferson Campus | | | Level 4 |  | | Level 3 |  | | Level 2 |  | | Level 1 |  | | Level 0 |  |   N =   |  |  | | --- | --- | | Shelby Campus | | | Level 4 | 9 | | Level 3 | 20 | | Level 2 | 6 | | Level 1 | 3 | | Level 0 | 2 |   N = 40  Jefferson Campus – \_\_\_%  Shelby Campus – 72.5%  Overall – \_\_\_% Success | Student success is at an acceptable level. We plan to continue on our present course concerning this objective.  This objective is addressed in Internet PHS 111 only. We plan to introduce a way to evaluate this objective for traditional courses as well, giving a more complete picture of student success in well written laboratory reports. |
| Plan submission date: September 15, 2017 | | | Submitted by: Ann Lyons | | |

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| jscc logo | **Assessment Record** |

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| **Program:** | **Mathematics, Engineering, Physical Sciences** | **Assessment period:** | **Fall 2016 – Summer 2017** |

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| |  | | --- | | **Program or Department Mission:** |   The Department of Mathematics/Engineering/Physical Sciences offers a broad range of courses that service the career programs of the college and that will transfer to baccalaureate degree granting institutions. The department also offers developmental mathematics courses to prepare students for college level mathematics. |

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| **Instructional Program Outcomes & Assessment Plan – PHS 112**  **Physical Science 112 Course Level Outcomes Assessment Rubric**  **For Exam and Quiz Questions**  Level 4: Student provides a correct response that is well organized – 100% credit  Level 3: Student provides a partially correct response containing well over half of the facts expected in a Level 4 response – 75% credit.  Level 2: Student provides partially correct response containing less than one half of the facts expected in a Level 4 response – 25 - 50% credit.  Level 1: Student attempts a solution, provides an incorrect response – 0% credit.  Level 0: Student does not attempt a solution.  **General Education Objective**  The General Educational Objective is met through the course objectives. Student mastery of the specific course objectives that follow will be evaluated by analyzing responses to appropriate questions on the comprehensive final exam, or quizzes and submitted laboratory reports.  **Evaluated Course Objectives**  The student will demonstrate knowledge of physical science using writing skills with correct grammar, spelling and punctuation by his/her ability to  1. Describe and differentiate between comets, meteors and asteroids.  2. Describe different kinds of weather fronts and their associated characteristics.  3. Demonstrate the technique for presenting and analyzing data by the submission of well written laboratory reports. | | | | | |
| **Intended Outcomes** | **Means of Assessment** | **Criteria for Success** | | **Summary & Analysis of Assessment Evidence** | **Use of Results** |
| PHS 111 Objective 1  The student will demonstrate fundamental skills of mathematics to solve problems by his/her ability to calculate the formula weight of a compound. | Rubric based assessment of related common final exam problems | 70% of students learning at a rubric level of 3 or higher | | |  |  | | --- | --- | | Jefferson Campus | | | Level 4 | 6 | | Level 3 | 1 | | Level 2 | 5 | | Level 1 | 6 | | Level 0 | 7 |   N = 25   |  |  | | --- | --- | | Shelby Campus | | | Level 4 | 0 | | Level 3 | 1 | | Level 2 | 0 | | Level 1 | 3 | | Level 0 | 6 |   N = 10  Jefferson Campus – 28.0%  Shelby Campus – 10%  Overall – 22.9 % Success | Overall Success – 22.9%  These results are abysmal. We are incorporating a homework program and hope to see marked improvements in all three objectives over the 2017-18 academic year. |
| PHS 111 Objective 2  The student will demonstrate fundamental skills of mathematics to solve problems by his/her ability to calculate the %-age composition of a compound. | Rubric based assessment of related common final exam problems | 70% of students learning at a rubric level of 3 or higher | | |  |  | | --- | --- | | Jefferson Campus | | | Level 4 | 4 | | Level 3 | 0 | | Level 2 | 3 | | Level 1 | 5 | | Level 0 | 13 |   N = 25   |  |  | | --- | --- | | Shelby Campus | | | Level 4 | 0 | | Level 3 | 0 | | Level 2 | 1 | | Level 1 | 3 | | Level 0 | 6 |   N =10  Jefferson Campus – 16 %  Shelby Campus – 0.0 %  Overall – 11.4 % Success | Overall success – 11.4%  These results are abysmal. We are incorporating a homework program and hope to see marked improvements in all three objectives over the 2017-18 academic year. |
| PHS 111 Objective 3  The student will demonstrate fundamental skills of mathematics to solve problems by his/her ability to compute the speed of a falling object given the time and initial speed. | Rubric based assessment of submitted lab reports for a common laboratory assignment. | 70% of students learning at a rubric level of 3 or higher | | |  |  | | --- | --- | | Jefferson Campus | | | Level 4 | 1 | | Level 3 | 2 | | Level 2 | 6 | | Level 1 | 10 | | Level 0 | 6 |   N = 25   |  |  | | --- | --- | | Shelby Campus | | | Level 4 | 0 | | Level 3 | 0 | | Level 2 | 2 | | Level 1 | 5 | | Level 0 | 3 |   N = 10  Jefferson Campus – 12 %  Shelby Campus – 0 %  Overall – 8.6 % Success | Overall Success – 8.6 %  These results are abysmal. We are incorporating a homework program and hope to see marked improvements in all three objectives over the 2017-18 academic year. |
| Plan submission date: September 15, 2017 | | | Submitted by: Ann Lyons | | |

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| jscc logo | | | **Assessment Record** | |
| **Program:** | **Mathematics, Engineering, Physical Sciences** | **Assessment period:** | | **Fall 2016 – Summer 2017** | |

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| **Course Student Learning Outcomes & Assessment Plan PHY 201 General Physics with Trigonometry**  General Education Outcome  Students will use abstract ideas, symbols, and fundamental skills of mathematics to analyze and solve problems.  Department Level Student Learning Outcomes   1. Students will acquire content knowledge of the physical sciences and mathematics. 2. Students will develop problem solving and critical thinking skills. 3. Students will be prepared to use mathematics in other disciplines.   Course Objective Assessed  The student will demonstrate fundamental skills of physics and mathematics to solve problems by his/her ability to   1. Understand Newton’s laws and attendant concepts will apply these in appropriate situations. 2. Understand energy and momentum and be able to apply these concepts to describing the behavior of system of particles. 3. Understand and be able to apply principles relating to the macroscopic properties of matter (State and apply Archimedes’ Principle and Bernoulli’s relation in problem situations.   The rubric used follows the assessment results. |

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| **Instructional Program Outcomes & Assessment Plan** | | | | |
| **Intended Outcomes** | **Means of Assessment** | **Criteria for Success** | **Summary & Analysis of Assessment Evidence** | **Use of Results** |
| Summary of Fall 2016 & Spring 2017 PHY 201 Objectives 1-3 | Rubric based assessment of related final exam problems. | At least 70% of students will produce solutions at rubric level 2 or higher. | |  | | --- | |  |   Number of Students Assessed  Fall 2016 — 1 section / 8 Students , Spring 2016 – 1 section /12  20 final exam questions related to the three objectives were assessed, and the number of solutions at each rubric level identified.   * 118 responses to problems related to objective 1 were assessed. * 117 responses to problems related to objective 2 were assessed. * 80 responses to problems related to objective 3 were assessed.   Level 3 – 165 (52%)  Level 2 - 28 (8.8%)  Level 1 – 33 (10.4%)  Level 0 – 89 (28.3%)  60.8% of solutions related to PHY201 objectives 1-3 were assessed at rubric level 2 or higher. | 60.8% of solutions related to PHY201 objectives 1-3 were assessed at rubric level 2 or higher which is not close to the success criteria set by the department. In order to improve the situation there is a need to:  1. Students taking the course have the required pre-requisite mathematics courses.  2.Tthe assessment must be focused on the goal of students developing problem solving and critical thinking skills rather than calculational skills.  It is also important to notice that there is lack of improvement over the previous assessment. 28.3% at level 0 seems to be very high.  Instructor’s comments are incorporated in the individual objectives which follow below. |
| PHY 201 Objective 1  1. Understand Newton’s laws and attendant concepts will apply these in appropriate situations. | Rubric based assessment of related final exam problems. | |  | | --- | |  | | | |   At least 70% of students will produce solutions at  Rubric level 2 or higher | Fall 2016 – Spring 2017  Number of Students Assessed  Fall 2016-Spring 2017, 2 sections / 20 Students  118 responses to related final exam questions were assessed, and the number of solutions at each rubric level identified.  Level 3 — 82 (69.5%)  Level 2 — 0 (0.0%)  Level 1— 11 (9.3%)  Level 0 — 25 (21%)  69.5% of solutions related to PHY 201 objective 1 were assessed at rubric level 2 or higher. | 69.5% of solutions related to PHY 201 objective 1 were assessed at rubric level 2 or higher which exceeds the criteria for success.  This is an indicator of success in achieving department level student learning outcomes.    21% at level 0 is very high. Fundamental ideas of the 2nd law of Newton must be emphasized. There should be more multi-steps problems using Newton’s Laws of motion using the results of Physics Education Research. |
| 2. Understand energy and momentum and be able to apply these concepts to describing the behavior of system of particles. | Rubric based assessment of related final exam problems. | At least 70% of students will produce solutions at  Rubric level 2 or higher | Fall 2016 – Spring 2017  Number of Students Assessed  Fall 2016-Spring 2017, 2 sections / 20 Students  117 responses to related final exam questions were assessed, and the number of solutions at each rubric level identified.  Level 3 — 49 (42%)  Level 2 — 21(18%)  Level 1— 16 (14%)  Level 0 — 31 (26.5%)  60% of solutions related to PHY 201 objective 1 were assessed at rubric level 2 or higher. | 60% of solutions related to PHY 201 objective 2 were assessed at rubric level 2 or higher.  Instructor comments in last year’s assessment indicated that there is a need to include more challenging questions such as more emphasis on multi-skills problems. Now, the current results is an indication that more moderate assessment of the students should be considered. Also the background knowledge of the students could have been a factor. |
| 3. Understand and be able to apply principles relating to the macroscopic properties of matter (State and apply Archimedes’ Principle and Bernoulli’s relation in problem situations. | Rubric based assessment of related final exam problems. | At least 70% of students will produce solutions at  Rubric level 2 or higher | Fall 2015 - Spring 2016  Number of Students Assessed  Fall 2016-Spring 2017, 2 sections / 20 Students  80 responses to related final exam questions were assessed, and the number of solutions at each rubric level identified.  Level 3 — 34 (42.5%)  Level 2 —7 (8.7%)  Level 1— 6 (7.5%)  Level 0 — 33 (41%)  51.2% of solutions related to PHY 201 objective 1 were assessed at rubric level 2 or higher. | 51.2% of solutions related to PHY 201 objective 3 were assessed at rubric level 2 or higher which is nowhere near the expected criteria for success.  Must be able to cover the concepts of Bernoulli’s principle. Again high percentage at level 0 must be improved. |
| **Plan submission date: 7/28/2017** | | | **Submitted by: Ali Yazdi** | |

**Assessment Record**

**Program: Mathematics, Engineering, Physical Sciences Assessment period: Fall 2016 – Summer 2017**

**Program or Department Mission:**

The Department of Mathematics/Engineering/Physical Sciences offers a broad range of courses that service the career programs of the college and that will transfer to baccalaureate degree granting institutions.

**Instructional Program Outcomes & Assessment Plan – PHY 214S**

**Physics Course Level Outcomes Assessment Rubric**

Level 3: Attempted Problem and Solved Correctly (full credit)

Level 2: Attempted Problem and Did Not Solve Correctly, Some Understanding of Problem Solution (at least half credit) Level 1: Did Not Attempt Problem or Failed to Show Understanding of Problem Solution (less than half credit)

**General Education Objective**

The student will demonstrate understanding of the equations and principles that govern electric fields, magnetic fields, and electrical circuits.

**Evaluated Course Objectives**

The General Educational Objective is met through the course objectives which require use of mathematical concepts, notations, and manipulations necessary in students’ field of study. Student mastery of the specific course objectives that follow will be evaluated by analyzing solutions for appropriate problems from the comprehensive final exam. The final exam will not be a multiple-choice exam. Students are required to show all of their work and will be graded on the quality of their technique, notation, and accuracy. The rubric above was used to evaluate the problems during the previous year including fall of 2016 through summer 2017.

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| The student will demonstrate knowledge of electromagnetic theory by his/her ability to:   1. Solve problems that involve electric fields. 2. Solve problems that involve magnetic fields. 3. Solve problems that involve electric circuits. | | | | |
| **Intended Outcomes** | **Means of Assessment** | **Criteria for Success** | **Summary & Analysis of Assessment Evidence** | **Use of Results** |
| PHY 214S Objective 1  The student will demonstrate knowledge of electromagnetic theory by his/her ability to solve problems that involve electric fields. | Rubric based assessment of related common final exam problems | 70% of students learning at a rubric level of 2 or higher | Objective 1:  Response Levels #1 / #2 / #3:  Spring 2017  5 (21%) / 9 (38%) / 10 (41%)  Summary for the year  5 (21%) / 9 (38%) / 10 (41%) | More than 70% of students met the criteria for success for objective 1. We might still be able to improve the result with supplementary material.. |

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| PHY 214S Objective 2  The student will demonstrate knowledge of electromagnetic theory by his/her ability to solve problems that involve magnetic fields. | Rubric based assessment of related common final exam problems | 70% of students learning at a rubric level of 2 or higher | Objective 2:  Response Levels #1 / #2 / #3:  Spring 2017  1 (4%) / 12 (50%) / 11 (46%)  Summary for the year  1 (4%) / 12 (50%) / 11 (46%) | More than 70% of students met the criteria for success for objective 2. We might still be able to improve the result with supplementary material.. |
| PHY 214S Objective 3 | Rubric based | 70% of students learning | Objective 3: | More than 70% of students |
| The student will |
| demonstrate | assessment of related | at a rubric level of 2 or | Response Levels #1 / #2 / #3: | met the criteria for success |
| knowledge of electromagnetic theory by his/her ability to solve problems that involve | common final exam  problems | higher | Spring 2017  3 (13%) / 11 (46%) / 10 (41%)  Summary for the year  3 (13%) / 11 (46%) / 10 (41%) | for objective 3. We might  still be able to improve the result with supplementary material. |
| electric circuits. |

**Assessment Record**

**Program: Mathematics, Engineering, Physical Sciences Assessment period: Fall 2016 – Summer 2017**

**Program or Department Mission:**

The Department of Mathematics/Engineering/Physical Sciences offers a broad range of courses that service the career programs of the college and that will transfer to baccalaureate degree granting institutions. The department also offers developmental mathematics courses to prepare students for college level mathematics.

**Instructional Program Outcomes & Assessment Plan – AST 220**

**General Education Objective**

The student will demonstrate understanding of distance, time scales, and scientific principles needed to comprehend the fundamental ideas of astronomy. The student will use abstract ideas, symbols, and fundamental skills of mathematics to analyze and solve problems.

**Department Outcomes**

* Provide freshman and sophomore-level courses in Chemistry, Mathematics, Physics, Physical Sciences, and Astronomy, with emphasis on critical thinking and analytical ability, that are transferable to public institutions of higher learning.
* Offer an appropriate remedial mathematics program accommodating various skill levels.
* Develop and provide courses relevant to the career and professional degree programs of the college.

**Astronomy Course Level Outcomes Assessment Rubric**

Level 3: Attempted Problem and Solved Correctly

Level 2: Attempted Problem and Did Not Solve Correctly Level 1: Did Not Attempt Problem

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| **Evaluated Course Objectives**  The General Education Objective is met through the course objectives that require the use of analogy and scientific concepts to understand fundamental elements of astronomy. Student mastery of the specific course objectives to follow will be evaluated by analyzing answers to appropriate questions from the comprehensive final exam. The astronomy final will be a comprehensive multiple choice exam.  The student will demonstrate knowledge of astronomy by his/her ability to:   1. Use analogy to describe size and distance scales between planets in the solar system, distance between star systems in galaxies, and distance between galaxies or galaxy clusters within the universe. 2. Be to describe the time scales for major cosmic events such as the age of the universe, when galaxies began to form, or when our solar system formed. 3. Demonstrate knowledge of basic scientific principles used by astronomers to understand the composition and the dynamics of the universe. | | | | |
| **Intended Outcomes** | **Means of Assessment** | **Criteria for Success** | **Summary & Analysis of Assessment Evidence** | **Use of Results** |
| AST 220 Objective 1 | Rubric based | 70% of students learning | Objective 1: | More than 70% of students |
|  | assessment of a | at a rubric level of 3 | Response Levels #1 / #2 / #3: | met the criteria for success |
| The student will | related common final |  | for objective 1. No need |
| demonstrate knowledge | exam problem that fits | Fall 2016 - 10391/15293 | for changes at this time. |
| of astronomy by his/her ability to use analogy to | the description given in objective 1 | 0 (0%) / 6 (11%) / 25 (89%)  0 (0%) / 9 (11%) / 22 (89%) | Tests are based on material covered in class and |
| describe size and distance | Spring 2017 - 33999/30569 | reinforced by the reading |
| scales between planets in | 2 (6%) / 2 (6%) / 30 (88%) | assignments and the labs. |
| the solar system, distance | 2 (6%) / 4 (11%) / 29 (83%) | Also, there seems to be |
| between star systems in  galaxies, and distance | Summer 2017 - 40029/40369 2 (0%) / 3 (17%) / 23 (83%) | more enthusiasm for the  subject compared to |
| between galaxies or galaxy | 0 (0%) / 4 (12%) / 24 (88%) | introductory courses in |
| clusters within the |  | other areas such as math. |
| universe. | Summary for the year  6 (2%) / 28 (13%) / 153 (85%) |

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| AST 220 Objective 2  The student will demonstrate knowledge of astronomy by his/her ability to be to describe the time scales for major cosmic events such as the age of the universe, when galaxies began to form, or when our solar system formed. | Rubric based assessment of a related common final exam problem that fits the description given in objective 2 | 70% of students learning at a rubric level of 3 | Objective 2:  Response Levels #1 / #2 / #3:  Fall 2016 - 10391/15293  0 (0%) / 8 (26%) / 23 (84%)  0 (0%) / 8 (26%) / 23 (84%)  Spring 2017 - 33999/30569 2 (6%) / 3 (9%) / 29 (86%)  2 (6%) / 3 (9%) / 30 (86%)  Summer 2017 - 40029/40369 2 (7%) / 5 (18%) / 21 (75%)  0 (0%) / 6 (21%) / 23 (79%)  Summary for the year  6 (2%) / 33 (18%) / 149 (80%) | More than 70% of students met the criteria for success for objective 2. No need for changes at this time.  Tests are based on material covered in class and reinforced by the reading assignments and the labs. Also, there seems to be more enthusiasm for the subject compared to introductory courses in other areas such as math. |
| AST 220 Objective 3 | Rubric based | 70% of students learning | Objective 3: | More than 70% of students |
|  | assessment of a | at a rubric level of 3 | Response Levels #1 / #2 / #3: | met the criteria for success |
| The student will | related common final |  | for objective 3. No need |
| demonstrate knowledge of astronomy by his/her ability to demonstrate | exam problem that fits  the description given in objective 3 | Fall 2016 - 10391/15293  0 (0%) / 9 (29%) / 22 (71%)  0 (0%) / 10 (32%) / 21 (68%) | for changes at this time.  Tests are based on material covered in class and |
| knowledge of basic | Spring 2017 - 33999/30569 | reinforced by the reading |
| scientific principles used | 2 (6%) / 1 (3%) / 31 (91%) | assignments and the labs. |
| by astronomers to | 2 (5%) / 2 (5%) / 31 (90%) | Also, there seems to be |
| understand the composition and the | Summer 2017 - 40029/40369 2 (6%) / 6 (21%) / 20 (71%) | more enthusiasm for the  subject compared to |
| dynamics of the universe. | 0 (0%) / 7 (24%) / 22 (76%) | introductory courses in |
|  | other areas such as math. |
| Summary for the year |
| 6 (1%) / 35 (19%) / 147 (78%) |

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| jscc logo | **Assessment Record** |

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| **Program:** | **Mathematics, Engineering, Physical Sciences** | **Assessment period:** | **Fall 2016 – Summer 2017** |

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| |  | | --- | | **Program or Department Mission:** |   The Department of Mathematics/Engineering/Physical Sciences offers a broad range of courses that service the career programs of the college and that will transfer to baccalaureate degree granting institutions. The department also offers developmental mathematics courses to prepare students for college level mathematics. |

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| **Instructional Program Outcomes & Assessment Plan – CHM 104**  **Chemistry Course Level Outcomes Assessment Rubric**  Level 4: Student provides a correct response that is well organized – 100% credit  Level 3: Student provides a partially correct response containing well over half of the facts expected in a Level 4 response – 75%- 99% credit.  Level 2: Student provides partially correct response containing less than one half of the facts expected in a Level 4 response – 25 - 50% credit.  Level 1: Student attempts a solution, provides an incorrect response – 0% - 49 credit.  Level 0: Student does not attempt a solution.  **General Education Objective**  Students will use abstract ideas, symbols, and fundamental skills of chemistry to analyze and solve problems.  **Evaluated Course Objectives**  The student will demonstrate knowledge of mathematics by his/her ability to  1. Make conversions between Fahrenheit, Celsius and Kelvin temperature scales.  2. Calculate density, mass, or volume of an object or substance from the given data.  3. Apply the combined gas law to find the volume of a gas when both the temperature and pressure change. |

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| **Intended Outcomes** | **Means of Assessment** | **Criteria for Success** | **Summary & Analysis of Assessment Evidence** | **Use of Results** |
| CHM 104 Objective 1  The student will demonstrate knowledge of mathematics by his/her ability to make conversions between Fahrenheit, Celsius and Kelvin temperature scales. | Rubric based assessment of related common final exam problems | 70% of students learning at a rubric level of 3 or higher | |  |  | | --- | --- | | Jefferson Campus | | | Level 4 | 16 | | Level 3 | 18 | | Level 2 | 30 | | Level 1 | 12 | | Level 0 | 8 | | N = 82 | | | Shelby Campus | | | Level 4 | 51 | | Level 3 | 4 | | Level 2 | 6 | | Level 1 | 5 | | Level 0 | 2 |   N = 68  Jefferson Campus – 41.5%  Shelby Campus – 80.9%  Overall – 59.3% Success | Overall success is 59.3%.  We plan to incorporate more homework problems related to temperature conversions in an effort to solidify student understanding and success in temperature conversions. |
| CHM 104 Objective 2  The student will demonstrate knowledge of mathematics by his/her ability to calculate density, mass, or volume of an object or substance from the given data. | Rubric based assessment of related common final exam problems | 70% of students learning at a rubric level of 3 or higher | |  |  | | --- | --- | | Jefferson Campus | | | Level 4 | 45 | | Level 3 | 2 | | Level 2 | 1 | | Level 1 | 7 | | Level 0 | 1 | | N = 56 | | | Shelby Campus | | | Level 4 | 40 | | Level 3 | 6 | | Level 2 | 6 | | Level 1 | 12 | | Level 0 | 5 |   N = 69  Jefferson Campus – 83.9%  Shelby Campus – 66.7%  Overall – 74.4% Success | Overall success is 74.4%.  While student success is at an acceptable level, it could be better.  We plan to incorporate more homework problems related to density calculations in an effort to solidify student understanding and success in density calculations. |
| CHM 104 Objective 3  The student will demonstrate knowledge of mathematics by his/her ability to apply the combined gas law to find the volume of a gas when both the temperature and pressure change. | Rubric based assessment of related common final exam problems | 70% of students learning at a rubric level of 3 or higher | |  |  | | --- | --- | | Jefferson Campus | | | Level 4 | 23 | | Level 3 | 11 | | Level 2 | 11 | | Level 1 | 21 | | Level 0 | 15 | | N = 81 | | | Shelby Campus | | | Level 4 | 20 | | Level 3 | 9 | | Level 2 | 9 | | Level 1 | 13 | | Level 0 | 18 |   N = 69  Jefferson Campus – 42.0%  Shelby Campus – 42.0%  Overall – 42.0% Success | Overall success is 42.0%.  We plan to incorporate more homework problems related to combined gas law applications in an effort to solidify student understanding and success in calculations involving the combined gas law. |

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| **Plan submission date: September 15, 2017** | **Submitted by: Ann Lyons** |

**Assessment Record**

**Program: Mathematics, Engineering, Physical Sciences** **Assessment period: Summer 2017**

**Program or Department Mission:**

The Department of Mathematics/Engineering/Physical Sciences offers a broad range of courses that service the career programs of the college and that will transfer to baccalaureate degree granting institutions. The department also offers developmental mathematics courses to prepare students for college level mathematics.

**Instructional Program Outcomes & Assessment Plan – CHM105**

# Chemistry Course Level Outcomes Assessment Rubric

Level 4: Student provides a complete and correct solution process that is well organized, with no errors.

Level 3: Student provides a complete solution process that is well organized, but contains minor errors.

Level 2: Student demonstrates understanding of methods required to produce a correct solution, but the solution process lacks expected organization and/or contains errors deemed more significant.

Level 1: Student attempts a solution, but demonstrates little understanding of methods required to produce a correct solution with expected organization.

Level 0: Student does not attempt a solution.

# General Education Objective

Students will use abstract ideas, symbols, and fundamental skills of chemistry to analyze and solve problems.

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| **Evaluated Course Objectives**  The student will demonstrate knowledge of chemistry by his/her ability to   1. Using structural formulas, draw and name three isomers when given the molecular formula. 2. Given a Fischer structure of a monosaccharide, draw both α – and β- Haworth structures 3. Show how α-amino acids form peptide linkages. | | | | |
| **Intended Outcomes** | **Means of Assessment** | **Criteria for Success** | **Summary & Analysis of Assessment Evidence** | **Use of Results** |
| CHM 105 Objective 1  The student will demonstrate knowledge of chemistry by his/her ability to, using structural formulas, draw and name three isomers when given the molecular formula. | Rubric based assessment of related common final exam problems | 70% of students learning at a rubric level of 2 or higher | |  |  |  | | --- | --- | --- | |  | **Campus** | | |  | Jefferson | Total,  % | | Level 4 | 17 | 81% | | Level 3 | 3 | 14% | | Level 2 | 0 | 0% | | Level 1 | 1 | 5% | | Level 0 | 0 | 0% | | Total | 21 |  |   Single section taught in Summer on Jefferson Campus | In 2017, 95%  perform at level 2 or higher.  Extra class time was spent making sure that students understood these concepts |

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|  | **Campus** | |
|  | Jefferson | Total,  % |
| Level 4 | 16 | 76% |
| Level 3 | 2 | 10% |
| Level 2 | 0 | 0% |
| Level 1 | 3 | 15% |
| Level 0 | 0 | 0% |
| Total 4 | 21 |  |

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|  | **Campus** | |
|  | Jefferson | Total,  % |
| Level 4 | 17 | 76% |
| Level 3 | 1 | 10% |
| Level 2 | 0 | 0% |
| Level 1 | 3 | 15% |
| Level 0 | 0 | 0% |
| Total 4 | 21 |  |

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| CHM 105 Objective 2  The student will demonstrate knowledge of chemistry by his/her ability to, given a Fischer structure of a monosaccharide, draw both **α** – and **β**- Haworth structures | Rubric based assessment of related common final exam problems | 70% of students learning at a rubric level of 2 or higher |  | | In 2017, 85%  perform at level 2 or higher.  This is a drop from last year, and may be due to students doing less homework and missing classes where this was discussed |
| CHM 105 Objective 3  The student will demonstrate knowledge of chemistry by his/her ability to show how α- amino acids form peptide linkages. | Rubric based assessment of related common final exam problems | 70% of students learning at a rubric level of 2 or higher |  | | In 2017, 85%  perform at level 2 or higher.  Again, this drop may be due to students missing class. |
| **Plan submission date: 8/7/2017** | | | | **Submitted by: Lisa Nagy** | |

**Assessment Record**

**Program: Mathematics, Engineering, Physical Sciences** **Assessment period: Fall 2016 – Spring 2017**

**Program or Department Mission:**

The Department of Mathematics/Engineering/Physical Sciences offers a broad range of courses that service the career programs of the college and that will transfer to baccalaureate degree granting institutions. The department also offers developmental mathematics courses to prepare students for college level mathematics.

**Instructional Program Outcomes & Assessment Plan – CHM111**

# Chemistry Course Level Outcomes Assessment Rubric

Level 4: Student provides a complete and correct solution process that is well organized, with no errors.

Level 3: Student provides a complete solution process that is well organized, but contains minor errors.

Level 2: Student demonstrates understanding of methods required to produce a correct solution, but the solution process lacks expected organization and/or contains errors deemed more significant.

Level 1: Student attempts a solution, but demonstrates little understanding of methods required to produce a correct solution with expected organization.

Level 0: Student does not attempt a solution.

# General Education Objective

Students will use abstract ideas, symbols, and fundamental skills of mathematics to analyze and solve problems.

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| **Evaluated Course Objectives**  The student will demonstrate his/her understanding of chemistry by being able to:   1. Carry out calculations relating density, specific gravity, mass, and volume to one another 2. Determine the empirical formula of compound, given the mass percentages of the elements or the analytical data from which these can be calculated, and determine the molecular formula of that compound, given an approximated molecular mass. 3. Given a reaction involving species in solution, relate the volumes or concentrations of two reactant species to the mass of solid precipitated. 4. Use the ideal gas law, determining the moles of a gas sample given its pressure, volume and temperature. 5. Draw the Lewis structure of a molecule or ion and predict its geometry. 6. Draw valid resonance structures including formal charges. 7. Use freezing point depression data to determine the molar mass of a substance. | | | | |
| **Intended Outcomes** | **Means of Assessment** | **Criteria for Success** | **Summary & Analysis of Assessment Evidence** | **Use of Results** |
| CHM 111 Objective 1 The student will demonstrate his/her understanding of chemistry by being able to carry out calculations relating density, specific gravity, mass, and volume to one another | Rubric based assessment of related common final exam problems | 70% of students learning at a rubric level of 2 or higher | |  |  |  |  | | --- | --- | --- | --- | |  | **Campus** | | | |  | Jefferson | Shelby | Total, % | | Level 4 | 27 | 73 | 74% | | Level 3 | 3 | 16 | 14% | | Level 2 | 1 | 9 | 7% | | Level 1 | 0 | 6 | 4% | | Level 0 | 0 | 0 | 0% | | Total | 31 | 104 | 135 | | This question involves a concept that students perform in the lab. The mathematics are very simple.  In 2016-17, 96%  performed at level 2 or higher. 89% performed at level 3 or higher.  The lab exercise reinforces the concept for students. |

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|  | **Campus** | | |
|  | Jefferson | Shelby | Total, % |
| Level 4 | 25 | 69 | 70% |
| Level 3 | 2 | 15 | 13% |
| Level 2 | 0 | 10 | 7% |
| Level 1 | 3 | 8 | 8% |
| Level 0 | 1 | 2 | 2% |
| Total | 31 | 104 | 135 |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| CHM 111 Objective 2 The student will demonstrate his/her understanding of chemistry by being able to determine the empirical formula of compound, given the mass percentages of the elements or the analytical data from which these can be calculated, and determine the molecular formula of that compound, given an approximated molecular mass. | Rubric based assessment of related common final exam problems | 70% of students learning at a rubric level of 2 or higher | |  |  |  |  | | --- | --- | --- | --- | |  | **Campus** | | | |  | Jefferson | Shelby | Total, % | | Level 4 | 25 | 55 | 59% | | Level 3 | 1 | 20 | 16% | | Level 2 | 4 | 13 | 13% | | Level 1 | 1 | 12 | 10% | | Level 0 | 0 | 4 | 3% | | Total | 31 | 104 | 135 | | This is a somewhat complex problem, and we go over it at length in all sections. It involves putting together several concepts. Although the steps to solve it can be memorized, student performance reflects their critical thinking abilities  In 2016-17, 87%  performed at level 2 or higher. 75% at level 3 or higher. |
| CHM 111 Objective 3 The student will demonstrate his/her understanding of chemistry by being able to given a reaction involving species in solution, relate the volumes or concentrations of two reactant species to the mass of solid precipitated | Rubric based assessment of related common final exam problems | 70% of students learning at a rubric level of 2 or higher |  | Most students make only minor errors on this problem. The concept of solution stoichiometry and limiting reagent is introduced early in the semester.  In 2016-17, 90%  performed at level 2 or higher. 83% perform at level 3 or higher. |

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|  | **Campus** | | |
|  | Jefferson | Shelby | Total, % |
| Level 4 | 27 | 61 | 65% |
| Level 3 | 1 | 16 | 13% |
| Level 2 | 0 | 11 | 8% |
| Level 1 | 2 | 16 | 13% |
| Level 0 | 1 | 0 | 1% |
| Total | 31 | 104 | 135 |

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|  |  |  |  | Since the limiting reagent problem is one of the most important concepts in CHM 111, we return to it several times throughout the semester. |
| CHM 111 Objective 4 The student will demonstrate his/her understanding of chemistry by being able to use the ideal gas law, determining the moles of a gas sample given its pressure, volume and temperature | Rubric based assessment of related common final exam problems | 70% of students learning at a rubric level of 2 or higher |  | This problem involves rather simple arithmetic and a low level of critical thinking. The students who make errors in this problem usually have trouble using their calculators correctly (use of scientific notation and parentheses).  In 2016-17, 86%  performed at level 2 or higher. 78% perform at level 3 or higher  All sections spend extra time with students who make calculator errors. |

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|  | **Campus** | | |
|  | Jefferson | Shelby | Total, % |
| Level 4 | 27 | 81 | 80% |
| Level 3 | 0 | 15 | 11% |
| Level 2 | 0 | 4 | 3% |
| Level 1 | 3 | 4 | 5% |
| Level 0 | 1 | 0 | 1% |
| Total | 31 | 104 | 135 |

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|  | **Campus** | | |
|  | Jefferson | Shelby | Total, % |
| Level 4 | 27 | 43 | 52% |
| Level 3 | 1 | 30 | 23% |
| Level 2 | 0 | 6 | 4% |
| Level 1 | 2 | 25 | 20% |
| Level 0 | 1 | 0 | 1% |
| Total | 31 | 104 | 135 |

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| CHM 111 Objective 5 The student will demonstrate his/her understanding of chemistry by being able to draw the Lewis structure of a molecule or ion and predict its geometry. | Rubric based assessment of related common final exam problems | 70% of students learning at a rubric level of 2 or higher |  | This problem involves qualitative reasoning, but very low level math skills.  In 2016-17, 94% performed at level 2 or higher. 91% perform at level 3 or higher.  Most students are able to draw the structure correctly in the exam, because they have to complete several similar problems in the assigned homework. |
| CHM 111 Objective 6 The student will demonstrate his/her understanding of chemistry by being able to draw valid resonance structures including formal charges | Rubric based assessment of related common final exam problems | 70% of students learning at a rubric level of 2 or higher |  | This problem also involves qualitative reasoning, but very low level math skills.  In 2016-17, 79%  performed at level 2 or higher, and 75% at level 3 or higher.  Most students are able to draw at least one of the two structures correctly in the exam, but either err in the assignment of charges, or in drawing the second structure. |

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| --- | --- | --- | --- |
|  | **Campus** | | |
|  | Jefferson | Shelby | Total, % |
| Level 4 | 26 | 49 | 56% |
| Level 3 | 3 | 22 | 19% |
| Level 2 | 0 | 9 | 7% |
| Level 1 | 1 | 12 | 10% |
| Level 0 | 1 | 12 | 10% |
| Total | 31 | 104 | 135 |

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| --- | --- | --- | --- | --- | --- |
| CHM 111 Objective 7 The student will demonstrate his/her understanding of chemistry by being able to use freezing point depression data to determine the molar mass of a substance | Rubric based assessment of related common final exam problems | 70% of students learning at a rubric level of 2 or higher |  | | This is a rather complex problem. It involves 4 steps. Although the steps to solve it can be memorized, student performance reflects critical thinking abilities. This problem is taught during the last week of classes, and also is presented as a lab.  In 2016-17, 80%  performed at level 2 or higher, and 74% at level 3 or higher.  This concept is reinforced in lab. |
| **Plan submission date:August 5, 2017** | | | | **Submitted by:Lisa Nagy** | |

**Assessment Record**

**Program: Mathematics, Engineering, Physical Sciences** **Assessment period: Fall 2016 – Summer 2017**

**Program or Department Mission:**

The Department of Mathematics/Engineering/Physical Sciences offers a broad range of courses that service the career programs of the college and that will transfer to baccalaureate degree granting institutions. The department also offers developmental mathematics courses to prepare students for college level mathematics.

**Instructional Program Outcomes & Assessment Plan – CHM112**

# Chemistry Course Level Outcomes Assessment Rubric

Level 4: Student provides a complete and correct solution process that is well organized, with no errors.

Level 3: Student provides a complete solution process that is well organized, but contains minor errors.

Level 2: Student demonstrates understanding of methods required to produce a correct solution, but the solution process lacks expected organization and/or contains errors deemed more significant.

Level 1: Student attempts a solution, but demonstrates little understanding of methods required to produce a correct solution with expected organization.

Level 0: Student does not attempt a solution.

# General Education Objective

Students will use abstract ideas, symbols, and fundamental skills of chemistry to analyze and solve problems.

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Evaluated Course Objectives**  The student will demonstrate his/her understanding of chemistry by being able to:   1. Use Le Chatelier's Principle to predict the direction in which a system at equilibrium will shift (if it does) when stresses are applied. 2. Predict ΔS (change in entropy) for many kinds of common changes, both chemical and physical. 3. Determine the percent ionization of a weak mono-protic acid or weak base, given the concentration and Ka or Kb 4. For a given redox reaction, use the Nernst equation to calculate the voltage E of a cell, given E°, and the concentrations of all other species. | | | | | | | | | |
| **Intended Outcomes** | **Means of Assessment** | **Criteria for Success** | **Summary & Analysis of Assessment Evidence** | | | | | | **Use of Results** |
| CHM 112 Objective 1 The student will demonstrate his/her understanding of chemistry by being able to use Le Chatelier's Principle to predict the direction in which a system at equilibrium will shift (if it does) when stresses are applied. | Rubric based assessment of related common final exam problems | 70% of students learning at a rubric level of 2 or higher |  | | | | | | This is a qualitative question that assesses understanding of a basic concept. We reinforce this concept with a laboratory exercise.  In 2016-17, 93%  perform at level 2 or higher. |
|  |  | **Campus** | | |  |
|  | Jefferson | Shelby | Total,  % |
| Level 0 | 0 | 0 | 0% |
| Level 1 | 0 | 3 | 7% |
| Level 2 | 0 | 4 | 10% |
| Level 3 | 0 | 5 | 12% |
| Level 4 | 0 | 29 | 71% |
| Total | 0 (No sect.) | 41 | 41 |

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| CHM 112 Objective 2 The student will demonstrate his/her understanding of chemistry by being able to predict ΔS (change in entropy) for many kinds of common changes, both chemical and physical. | Rubric based assessment of related common final exam problems | 70% of students learning at a rubric level of 2 or higher |  |  | **Campus** | | |  | This is another qualitative question that assesses understanding of a basic concept. We reinforce this concept with a laboratory exercise.  In 2016-17, 84%  perform at level 2 or higher.  This year showed a decrease in performance, consistent with course performance and attendance. |
|  | Jefferson | Shelby | Total,  % |
| Level 0 |  | 2 | 5% |
| Level 1 |  | 5 | 12% |
| Level 2 |  | 5 | 12% |
| Level 3 |  | 8 | 20% |
| Level 4 |  | 21 | 51% |
| Total |  | 41 | 41 |
| Jefferson Section was not assessed in Spring 2016 | | | | | |
| CHM 112 Objective 3 The student will demonstrate his/her understanding of chemistry by being able to determine the percent ionization of a weak mono-protic acid or weak base, given the concentration and Ka or Kb | Rubric based assessment of related common final exam problems | 70% of students learning at a rubric level of 2 or higher |  |  | **Campus** | | |  | This is a multi-step question that assesses ability to complete a complex calculation. We reinforce this concept with a laboratory exercise and parameterized homework problems.  In 2016-17, 88%  perform at level 2 or higher. Again, student performance decreased with poor attendance. |
|  | Jefferson | Shelby | Total,  % |
| Level 0 |  | 1 | 2% |
| Level 1 |  | 4 | 10% |
| Level 2 |  | 4 | 10% |
| Level 3 |  | 8 | 20% |
| Level 4 |  | 24 | 59% |
| Total |  | 41 | 41 |
| Jefferson Section was not assessed in Spring 2016 | | | | | |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| CHM 112 Objective 4 The student will demonstrate his/her understanding of chemistry by being able to use the Nernst equation to calculate the voltage E of a cell, given E°, and the concentrations of all other species. | Rubric based assessment of related common final exam problems | 70% of students learning at a rubric level of 2 or higher |  |  | | **Campus** | | |  | This question that assesses both complex calculation and critical thinking skills. We reinforce this concept with a laboratory exercise and parameterized homework problems. In 2016-17, 85%  perform at level 2 or higher.  We address common errors in the problem in lecture, but the attendance was lower. |
|  | | Jefferson | Shelby | Total,  % |
| Level 0 | |  | 2 | 5% |
| Level 1 | |  | 4 | 10% |
| Level 2 | |  | 4 | 10% |
| Level 3 | |  | 7 | 17% |
| Level 4 | |  | 24 | 59% |
| Total | |  | 41 | 41 |
| Jefferson Section was not assessed in Spring 2016 | | | | | | |
| **Plan submission date:July 27, 2017** | | | | | **Submitted by: Lisa Nagy** | | | | | |

**Assessment Record**

**Program: Mathematics, Engineering, Physical Sciences** **Assessment period: Spring 2016 \*only taught Spring**

**Program or Department Mission:**

The Department of Mathematics/Engineering/Physical Sciences offers a broad range of courses that service the career programs of the college and that will transfer to baccalaureate degree granting institutions. The department also offers developmental mathematics courses to prepare students for college level mathematics.

**Instructional Program Outcomes & Assessment Plan – CHM221**

# Chemistry Course Level Outcomes Assessment Rubric

Level 4: Student provides a complete and correct solution process that is well organized, with no errors.

Level 3: Student provides a complete solution process that is well organized, but contains minor errors.

Level 2: Student demonstrates understanding of methods required to produce a correct solution, but the solution process lacks expected organization and/or contains errors deemed more significant.

Level 1: Student attempts a solution, but demonstrates little understanding of methods required to produce a correct solution with expected organization.

Level 0: Student does not attempt a solution.

# General Education Objective

Students will use abstract ideas, symbols, and fundamental skills of chemistry to analyze and solve problems.

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| --- | --- | --- | --- | --- |
| **Evaluated Course Objectives**  The student will demonstrate his/her understanding of chemistry by being able to:   1. Locate chirality centers, assign priorities to substituents, and assign R, S designations to chirality centers. 2. Propose structures for compounds, given their NMR, IR, and mass spectra 3. Calculate the degree of unsaturation of any compound, including those containing N, O, and halogens. | | | | |
| **Intended Outcomes** | **Means of Assessment** | **Criteria for Success** | **Summary & Analysis of Assessment Evidence** | **Use of Results** |
| CHM 221 Objective 1 The student will demonstrate knowledge of organic chemistry by his/her ability to locate chirality centers, assign priorities to substituents, and assign R, S designations to chirality centers. | Rubric based assessment of related common final exam problems | 70% of students learning at a rubric level of 2 or higher | |  |  |  | | --- | --- | --- | |  | **Shelby Campus** | | |  | 2015-  2016 | Total 2013-2016 | | Level 0 | 0 | 0% | | Level 1 | 1 | 13% | | Level 2 | 0 | 0% | | Level 3 | 2 | 25% | | Level 4 | 5 | 63% | | Total | 8 | 8 |   Only taught once a year | This is a qualitative question that assesses spatial ability as well as understanding of the rules of chirality  In 2016-2017, 88%  perform at level 2 or higher.  This class was taught as a hybrid, but the students regularly asked for help during the in-person meetings and online. |

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|  | **Campus** | |
|  | Shelby | 2015-  2016 |
| Level 0 | 0 | 0% |
| Level 1 | 1 | 13% |
| Level 2 | 0 | 0% |
| Level 3 | 2 | 25% |
| Level 4 | 5 | 63% |
| Total | 8 | 8 |

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| --- | --- | --- |
|  | **Campus** | |
|  | Shelby | 2015-2016 |
| Level 0 | 0 | 0% |
| Level 1 | 0 | 0% |
| Level 2 | 0 | 0% |
| Level 3 | 0 | 0% |
| Level 4 | 8 | 100% |
| Total | 8 | 8 |

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| --- | --- | --- | --- | --- | --- |
| CHM 221 Objective 2 The student will demonstrate knowledge of organic chemistry by his/her ability to propose structures for compounds, given their NMR, IR, and mass spectra | Rubric based assessment of related common final exam problems | 70% of students learning at a rubric level of 2 or higher |  | | This question assesses problem solving and critical thinking skills In 2016-2017, 88%  perform at level 2 or higher.  The small class size allows discussion of the problems, and assignment of parameterized homework encourages practice. Students formed a study group. |
| CHM 112 Objective 3 The student will demonstrate knowledge of chemistry by his/her ability to calculate the degree of unsaturation of any compound, including those containing N, O, and halogens. | Rubric based assessment of related common final exam problems | 70% of students learning at a rubric level of 2 or higher |  | | This is an arithmetic question that assesses use of a general formula.  In 2016-2017, 100%  perform at level 2 or higher. This concept is reviewed frequently during the semester. The small class size enables discussion. |
| **Plan submission date: July 27, 2017** | | | | **Submitted by:Lisa Nagy** | |

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| jscc logo | **Assessment Record** |

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| **Program:** | **Mathematics, Engineering, Physical Sciences** | **Assessment period:** | **Summer 2017 CRN 43996** |

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| |  | | --- | | **Program or Department Mission:** |   The Department of Mathematics/Engineering/Physical Sciences offers a broad range of courses that service the career programs of the college and that will transfer to baccalaureate degree granting institutions. The department also offers developmental mathematics courses to prepare students for college level mathematics. |

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| **Instructional Program Outcomes & Assessment Plan – CHM 222**  **Chemistry Course Level Outcomes Assessment Rubric**  Level 4: Student provides a correct solution that is well organized  Level 3: Student provides a solution that is well organized, but with a minor error.  Level 2: Student uses correct approach, but misses a greater portion of the problem.  Level 1: Student attempts a solution, with incorrect approach.  Level 0: Student does not attempt a solution.  **General Education Objective**  Students will use abstract ideas, symbols, and fundamental skills of chemistry to analyze and solve problems.  **Evaluated Course Objectives**  The student will demonstrate knowledge of organic chemistry by his/her ability to  1. Calculate dissociation constants of carboxylic acids, and predict the relative acidities of substituted carboxylic acids.  2. Predict the products of carbonyl condensation reactions.  3. Use carbonyl condensation reactions in synthesis. |

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| **Intended Outcomes** | **Means of Assessment** | **Criteria for Success** | **Summary & Analysis of Assessment Evidence** | **Use of Results** |
| CHM 222 Objective 1  The student will demonstrate knowledge of organic chemistry by his/her ability to calculate dissociation constants of carboxylic acids, and predict the relative acidities of substituted carboxylic acids. | Rubric based assessment of related common final exam problems | 70% of students learning at a rubric level of 2 or higher | |  |  |  | | --- | --- | --- | | Shelby Campus | | | | Level 4 | 3 | 30% | | Level 3: | 6 | 60% | | Level 2 | 1 | 10% | | Level 1 | 0 | 0% | | Level 0 | 0 | 0% | | Total | 10 |  | | General:  Achievement levels dropped in this class because it was taught in the summer as a hybrid- there is not enough time for the concepts to sink in.  For this question, 100% perform at level 2 or higher. |
| CHM 222 Objective 2  The student will demonstrate knowledge of chemistry by his/her ability to predict the products of carbonyl condensation reactions | Rubric based assessment of related common final exam problems | 70% of students learning at a rubric level of 2 or higher | |  |  |  | | --- | --- | --- | | Shelby Campus | | | | Level 4 | 5 | 50% | | Level 3: | 2 | 20% | | Level 2 | 1 | 10% | | Level 1 | 3 | 30% | | Level 0 | 0 | 0% | | Total | 10 |  | | We practice these concepts in class.  80% at level 2 or higher |
| CHM 222 Objective 3  The student will demonstrate knowledge of chemistry by his/her ability to use carbonyl condensation reactions in synthesis | Rubric based assessment of related common final exam problems | 70% of students learning at a rubric level of 2 or higher | |  |  |  | | --- | --- | --- | | Shelby Campus | | | | Level 4 | 3 | 30% | | Level 3: | 5 | 50% | | Level 2 | 1 | 10% | | Level 1 | 1 | 10% | | Level 0 | 0 | 0% | | Total | 10 |  | | This is a difficult concept that comes late in the semester.  Because of the hybrid format, there was less discussion of the difficult concepts.  90% at level 2 or higher |

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| **Plan submission date:8/7/2017** | **Submitted by:Lisa Nagy** |