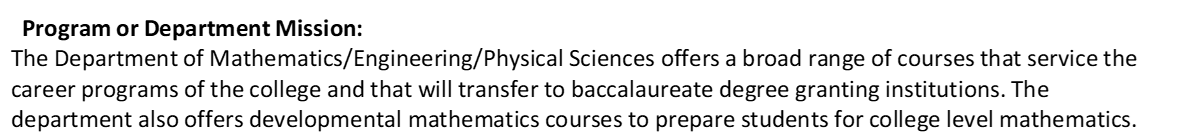
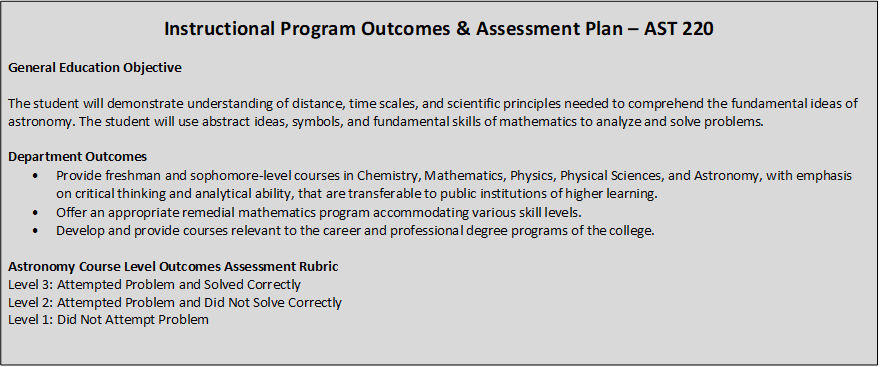


**Program: Mathematics, Engineering, Physical Sciences Assessment period: Fall 2018-SUMMER 2019**



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| **Subj** | | **Crse** | | **Title** | | **Instructor** |
| **AST** | | **220** | | **Introduction to Astronomy** | | **Robert O Wallace** |
| **CHM** | | **104** | | **Introduction to Inorganic Chemistry** | | **Charlotte S Lyons** |
| **CHM** | | **105** | | **Introduction to Organic Chemistry** | | **Lisa Alexandria Nagy** |
| **CHM** | | **111** | | **College Chemistry I** | | **Lisa Alexandria Nagy** |
| **CHM** | | **112** | | **College Chemistry II** | | **Lisa Alexandria Nagy** |
| **CHM** | | **221** | | **Organic Chemistry I** | | **Lisa Alexandria Nagy** |
| **CHM** | | **222** | | **Organic Chemistry II** | | **Lisa Alexandria Nagy** |
|  | | | | | | |
| **MTH** | | **090** | | **Basic Mathematics** | | **Nanette Easterling/ Jarrod Cunningham** |
| **MTH** | | **098** | | **Elementary Algebra** | | **Nanette Easterling/ Jarrod Cunningham** |
| **MTH** | | **099/100** | | **Intermediate College Algebra** | | **Jeffrey Darby/Sabrina Moore** |
| **MTH** | | **110** | | **Finite Mathematics** | | **Samuel White** |
| **MTH** | | **112** | | **Precalculus Algebra** | | **Yu-Ing Hargett/Margaret H Thrasher** |
| **MTH** | | **113** | | **Precalculus Trigonometry** | | **Ethel Louise Fall** |
| **MTH** | | **116** | | **Mathematical Applications** | | **Jamie Holley** |
| **MTH** | | **120** | | **Calculus and its Applications** | | **Samuel White/Ethel Louise Fall** |
| **MTH** | | **125S** | | **Calculus I** | | **Konstantinos Theodorou** |
| **MTH** | | **126S** | | **Calculus II** | | **Konstantinos Theodorou** |
| **MTH** | | **227** | | **Calculus III** | | **Robert O Wallace** |
| **MTH** | | **238** | | **Applied Differential Equations I** | | **Robert O Wallace** |
| **MTH** | | **265** | | **Elementary Statistics** | | **Konstantinos Theodorou** |
|  | | | | | | |
| **PHS** | **111** | | **Physical Science I** | | **Charlotte S Lyons** | |
| **PHS** | **112** | | **Physical Science II** | | **Charlotte S Lyons** | |
|  | | | | | | |
| **PHY** | **201** | | **General Physics I-Trig Based** | | **Aliakbar Rismanchi Yazdi (P)** | |
| **PHY** | **202** | | **General Physics II Trig-Based** | | **Aliakbar Rismanchi Yazdi (P)** | |
| **PHY** | **213S** | | **General Physics with Calculus I** | | **Robert O Wallace (P)** | |
|  | | | | | | |
| **PHY** | **214S** | | **General Physics with Calculus II** | | **Robert O Wallace (P)** | |



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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  The student will demonstrate knowledge of astronomy by his/her ability to 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. | Rubric based assessment of a related common final exam problem that fits the description given in objective 1 | 70% of students learning at a rubric level of 3 | Jefferson Campus Level 3 81/96 84% Level 2 11/96 12% Level 1 4/96 4%  Shelby Campus Level 3 96/105 91% Level 2 6/105 6% Level 1 3/105 3% | 88% (177/201)  performed at Level 3 or higher. Up from 81% last year. The overall percentage of students that scored at level 3 increased this academic year. Our recommendation is to continue adding discussion questions on the relative sizes of objects in our universe in the chapter review and perhaps in the lab. |

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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 | Jefferson Campus Level 3 80/96 83% Level 2 12/96 13% Level 1 4/96 4%  Shelby Campus Level 3 95/105 90% Level 2 7/105 7% Level 1 3/105 3% | . 87% (175/201)  performed at Level 3 or higher. Up from 79% last year. The overall percentage of students that scored at level 3 increased this academic year. Our recommendation is to continue adding discussion questions the timing of events since the Big Bang in the chapter review. |
| AST 220 Objective 3 The student will  demonstrate knowledge of astronomy by his/her ability to demonstrate knowledge of basic scientific principles used by astronomers to understand the composition and the dynamics of the universe. | Rubric based assessment of a related common final exam problem that fits the description given in objective 3 | 70% of students learning at a rubric level of 3 | Jefferson Campus Level 3 80/96 83% Level 2 12/96 13% Level 1 4/96 4%  Shelby Campus Level 3 92/105 88% Level 2 10/105 9% Level 1 3/105 3% | 86% (172/201)  performed at Level 3 or higher. Up from 78% last year. The overall percentage of students that scored at level 3 increased this academic year. Our recommendation is to continue to include additional demonstrations of the basic scientific principles in lab to help further increase understanding. |

**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 problem

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| **Departmental Objectives:**   1. 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. 2. Offer an appropriate remedial mathematics program accommodating various skill levels. 3. Develop and provide courses relevant to the career and professional degree programs of the college.   **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 | 10 | 53% | | Level 3 | 6 | 32% | | Level 2 | 3 | 16% | | Level 1 | 0 | 0% | | Level 0 | 0 | 0% | | Total | 19 |  |   100% Success. Single section taught in Summer on Jefferson Campus | In 2018, 100% perform at level 2 or higher.  As in past years, extra class time is spent making sure that students understood these concepts |

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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 | 100% Success   |  |  |  | | --- | --- | --- | |  | **Campus** | | |  | Jefferson | Total,  % | | Level 4 | 12 | 63% | | Level 3 | 2 | 11% | | Level 2 | 3 | 16% | | Level 1 | 0 | 0% | | Level 0 | 0 | 0% | | Total 4 | 19 |  | |  |  |  | | | In 2018, 70% perform at level 2 or higher  We went over this topic extensively in class time and study sessions. . |
| 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 | |  |  |  | | --- | --- | --- | |  | **Campus** | | |  | Jefferson | Total,  % | | Level 4 | 12 | 63% | | Level 3 | 1 | 0.5% | | Level 2 | 2 | 11% | | Level 1 | 4 | 21% | | Level 0 | 0 | 0% | | Total 4 | 19 |  |   79% success | | In 2018, 90%  performed at level 2 or higher. In 2019, 79% performed at level 2 or higher. |
| **Plan submission date: August 28th, 2019** | | | | **Submitted by: Lisa Nagy** | |

**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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| **Departmental Objectives:**   1. 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. 2. Offer an appropriate remedial mathematics program accommodating various skill levels. 3. 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 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 | |  |  |  |  |  | | --- | --- | --- | --- | --- | | Q 1 | Campus | | | | | Level | Jeff. | Shelby | Total | Total(%) | | 4 | 29 | 79 | 108 | 88% | | 3 | 6 | 2 | 8 | 7% | | 2 | 1 | 4 | 5 | 4% | | 1 | 1 | 1 | 2 | 2% | | 0 | 0 | 0 | 0 | 0% | | Total | 37 | 86 | 123 | 100% | | Success | 98% |  |  |  | | In 2017-18, 94%  performed at level 2 or higher. In 2018-19, 98% performed at level 2 or higher.  In 2018-19 we began using flipped classes in 4 sections. Students work problems while in class, and watch lectures online. |

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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 | |  |  |  |  |  | | --- | --- | --- | --- | --- | | Q 2 | Campus | | | | | Level | Jeff. | Shelby | Total | Total(%) | | 4 | 15 | 35 | 50 | 41% | | 3 | 15 | 25 | 40 | 33% | | 2 | 3 | 16 | 19 | 15% | | 1 | 0 | 7 | 7 | 6% | | 0 | 4 | 3 | 7 | 6% | | Total | 37 | 86 | 123 | 100% | | Success | 89% |  |  |  | | In 2017-18, 93%  performed at level 2 or higher. In 2018-19, 89% performed at level 2 or higher.  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. A large number of practice problems were made available to the students. |
| CHM 111 Objective 3 The student will demonstrate his/her understanding of chemistry by being able to 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 | |  |  |  |  |  | | --- | --- | --- | --- | --- | | Q 3 | Campus | | | | | Level | Jeff. | Shelby | Total | Total(%) | | 4 | 26 | 41 | 67 | 54% | | 3 | 5 | 17 | 22 | 18% | | 2 | 6 | 17 | 23 | 19% | | 1 | 0 | 9 | 9 | 7% | | 0 | 0 | 2 | 2 | 2% | | Total | 37 | 86 | 123 | 100% | | Success | 91% |  |  |  | | In 2017-18, 93%  performed at level 2 or higher. In 2018-19, 91% performed at level 2 or higher.  Since the limiting reagent problem is one of the most important concepts in CHM 111, we return to it several times throughout the semester. This concept is stressed heavily, and students are given |

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|  |  |  |  | extra quizzes to reinforce the concept. We will continue the use of homework programs and extra practice quizzes. |
| 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 | |  |  |  |  |  | | --- | --- | --- | --- | --- | | Q 4 | Campus | | | | | Level | Jeff. | Shelby | Total | Total(%) | | 4 | 33 | 67 | 100 | 81% | | 3 | 0 | 9 | 9 | 7% | | 2 | 4 | 4 | 8 | 7% | | 1 | 0 | 4 | 4 | 3% | | 0 | 0 | 2 | 2 | 2% | | Total | 37 | 86 | 123 | 100% | | Success | 95% |  |  |  |   86% Success | In 2017-18, 94%  performed at level 2 or higher. In 2018-19, 95% performed at level 2 or higher.  We continue to have the students perform diagnostic exercises in class, which allowed them to determine whether they were using their calculators properly. This seems to increase success somewhat in problems that involve more complex calculations. |

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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 | |  |  |  |  |  | | --- | --- | --- | --- | --- | | Q 5 | Campus | | | | | Level | Jeff. | Shelby | Total | Total(%) | | 4 | 35 | 65 | 100 | 81% | | 3 | 1 | 11 | 12 | 10% | | 2 | 1 | 8 | 9 | 7% | | 1 | 0 | 0 | 0 | 0% | | 0 | 0 | 2 | 2 | 2% | | Total | 37 | 86 | 123 | 100% | | Success | 98% |  |  |  | | In 2017-18, 93%  performed at level 2 or higher. In 2018-19, 98% performed at level 2 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. We will continue with web-based 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 | |  |  |  |  |  | | --- | --- | --- | --- | --- | | Q 6 | Campus | | | | | Level | Jeff. | Shelby | Total | Total(%) | | 4 | 26 | 49 | 75 | 61% | | 3 | 6 | 18 | 24 | 20% | | 2 | 1 | 11 | 12 | 10% | | 1 | 2 | 4 | 6 | 5% | | 0 | 2 | 4 | 6 | 5% | | Total | 37 | 86 | 123 | 100% | | Success | 90% |  |  |  | | In 2017-18, 93%  performed at level 2 or higher. In 2018-19, 90% performed at level 2 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. We will spend more time on this concept. |

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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 | |  |  |  |  |  | | --- | --- | --- | --- | --- | | Q 7 | Campus | | | | | Level | Jeff. | Shelby | Total | Total(%) | | 4 | 29 | 22 | 51 | 41% | | 3 | 5 | 24 | 29 | 24% | | 2 | 2 | 18 | 20 | 16% | | 1 | 1 | 8 | 9 | 7% | | 0 | 0 | 14 | 14 | 11% | | Total | 37 | 86 | 123 | 100% | | Success | 81% |  |  |  | | | In 2017-18, 93%  performed at level 2 or higher. In 2018-19, 81% performed at level 2 or higher.  Students seemed to have a harder time with this problem than in previous years, with an increased number not attempting the problem at all. |
| **Plan submission date: August 26th, 2019** | | | | **Submitted by: Lisa Nagy** | |

**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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| **Departmental Objectives:**   1. 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. 2. Offer an appropriate remedial mathematics program accommodating various skill levels. 3. 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 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 | |  |  |  |  |  | | --- | --- | --- | --- | --- | |  |  |  |  |  | | Q 1 | Campus | | | | | Level | Jeff. | Shelby | Total | Total(%) | | 4 | 11 | 29 | 40 | 52% | | 3 | 2 | 19 | 21 | 27% | | 2 | 2 | 6 | 8 | 10% | | 1 | 2 | 6 | 8 | 10% | | 0 | 0 | 0 | 0 | 0% | | Total | 17 | 60 | 77 | 100% | | Success | 90% |  |  |  | | In 2017-18, 93% perform at level 2 or higher. The results are relatively unchanged. This is a qualitative question that assesses understanding of a basic concept. We reinforce this concept with a laboratory exercise. We are using newly acquired laboratory equipment for a hands-on exploration of this concept. |
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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 | |  |  |  |  |  | | --- | --- | --- | --- | --- | | Q 2 | Campus | | | | | Level | Jeff. | Shelby | Total | Total(%) | | 4 | 15 | 35 | 50 | 65% | | 3 | 1 | 17 | 18 | 23% | | 2 | 0 | 2 | 2 | 3% | | 1 | 1 | 6 | 7 | 9% | | 0 | 0 | 0 | 0 | 0% | | Total | 17 | 60 | 77 | 100% | | Success | 91% |  |  |  | | In 2017-18, 91% perform at level 2 or higher.  This is another qualitative question that assesses understanding of a basic concept |
| 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 | |  |  |  |  |  | | --- | --- | --- | --- | --- | | Q 3 | Campus | | | | | Level | Jeff. | Shelby | Total | Total(%) | | 4 | 12 | 37 | 49 | 64% | | 3 | 0 | 13 | 13 | 17% | | 2 | 1 | 4 | 5 | 6% | | 1 | 2 | 3 | 5 | 6% | | 0 | 2 | 3 | 5 | 6% | | Total | 17 | 60 | 77 | 100% | | Success | 87% |  |  |  | | In 2017-18, 90% perform at level 2 or higher. 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.  We use newly acquired lab instrumentation for this concept. |

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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 | |  |  |  |  |  | | --- | --- | --- | --- | --- | | Q 4 | Campus | | | | | Level | Jeff. | Shelby | Total | Total(%) | | 4 | 12 | 36 | 48 | 62% | | 3 | 0 | 17 | 17 | 22% | | 2 | 0 | 2 | 2 | 3% | | 1 | 1 | 3 | 4 | 5% | | 0 | 4 | 2 | 6 | 8% | | Total | 17 | 60 | 77 | 100% | | Success | 87% |  |  |  | | | In 2017-18, 91% performed at level 2 or higher.  This question that assesses both complex calculation and critical thinking skills. We reinforce this concept with a laboratory exercise and parameterized homework problems. We are using new laboratory instrumentation to reinforce this concept. |
| **Plan submission date: August 28th, 2019** | | | | **Submitted by: Lisa Nagy** | |

**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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| **Departmental Objectives:**   1. 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. 2. Offer an appropriate remedial mathematics program accommodating various skill levels. 3. 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 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 | |  |  |  |  | | --- | --- | --- | --- | | Q 1 | Campus | | | | Level | **Jefferson** | Total | Total(%) | | 4 | 6 | 6 | 46% | | 3 | 5 | 5 | 38% | | 2 | 0 | 0 | 0% | | 1 | 2 | 2 | 15% | | 0 | 0 | 0 | 0% | | Total | 13 | 13 | 100% | | Success | 85% |  |  | | In 2017-2018, 100% perform at level 2 or higher. In 2018-19, 85% perform at level 2 or higher.  This is a qualitative question that assesses spatial ability as well as understanding of the rules of chirality |

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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 | |  |  |  |  | | --- | --- | --- | --- | | Q 2 | Campus | | | | Level | **Jefferson** | Total | Total(%) | | 4 | 4 | 4 | 31% | | 3 | 5 | 5 | 39% | | 2 | 2 | 2 | 15% | | 1 | 2 | 2 | 15% | | 0 | 0 | 0 | 0% | | Total | 13 | 13 | 100% | | Success | 85% |  |  | | | In 2017-2018, 88% perform at level 2 or higher. In 2018-19, 85% performed at level 2 or higher. |
| CHM 221 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 | |  |  |  |  | | --- | --- | --- | --- | | Q 3 | Campus | | | | Level | **Jefferson** | Total | Total(%) | | 4 | 10 | 10 | 77% | | 3 | 3 | 3 | 23% | | 2 | 0 | 0 | 0% | | 1 | 0 | 0 | 0% | | 0 | 0 | 0 | 0% | | Total | 13 | 13 | 100% | | Success | 100% |  |  | | | In 2017-2018, 100% perform at level 2 or higher. This concept is reviewed frequently during the semester. The small class size enables discussion. |
| **Plan submission date: August 28th, 2019** | | | | **Submitted by: Lisa Nagy** | |

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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.  **Departmental Objectives:**   1. 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. 2. Offer an appropriate remedial mathematics program accommodating various skill levels. 3. Develop and provide courses relevant to the career and professional degree programs of the college.   **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 | |  |  |  |  | | --- | --- | --- | --- | | Q 1 | Campus | | | | Level | Jefferson | Total | Total(%) | | 4 | 3 | 3 | 33% | | 3 | 3 | 3 | 33% | | 2 | 2 | 2 | 22% | | 1 | 1 | 1 | 11% | | 0 | 0 | 0 | 0% | | Total | 9 | 9 | 100% | | Success | 88% |  |  | | In 2017-18, 83% perform at level 2 or higher. In 2018-19, 88% perform at level 2 or higher.  We review this topic from CHM 112 extensively in both CHM 221 and 222. |
| 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 | |  |  |  |  | | --- | --- | --- | --- | | Q 2 | Campus | | | | Level | Jefferson | Total | Total(%) | | 4 | 3 | 3 | 33% | | 3 | 2 | 2 | 22% | | 2 | 2 | 2 | 22% | | 1 | 2 | 2 | 22% | | 0 | 0 | 0 | 0% | | Total | 9 | 9 | % | | Success | 78% |  |  | | In 2017-18, 100% perform at level 2 or higher. In 2018-19, 78% performed at level 2 or higher. In 2019, the class format was changed to a “flipped class”, but students did not access recorded lectures before class. In the 2019-20 year, we are grading students on whether they watch the lectured by the due date and are using frequent low-stakes assessments. |
| 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 | |  |  |  |  | | --- | --- | --- | --- | | Q 3 | Campus | | | | Level | Jefferson | Total | Total(%) | | 4 | 1 | 1 | 11% | | 3 | 3 | 3 | 33% | | 2 | 3 | 3 | 33% | | 1 | 2 | 2 | 22% | | 0 | 0 | 0 | 0% | | Total | 9 | 9 | % | | Success | 77% |  |  | | In 2017-18, 83% are at level 2 or higher. In 2018-19, 77% performed at level 2 or higher. This is a difficult concept that comes late in the semester. |

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| **Plan submission date: August 28th, 2019** | **Submitted by: Lisa Nagy** |

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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. Evaluate algebraic expressions using given numerical values.  3. Graph a linear equation.  4. Write the equation of a line given appropriate information. |

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| **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 | Fall 2018-Spring 2019  Total of students 416/24 Sections  Jefferson – 10 Sections  Shelby- 6 Sections  Clanton – 5 Sections  Pell City – 3 Sections  84.6% Overall performed at Level 2 or higher  Jefferson:83.2% at level 2 or higher  Shelby: 86.5% at level 2 or higher  Clanton: 80.6% at level 2 or higher  Pell City: 91.5% at level 2 or higher  Level 4:Jefferson-60/143=37.9%  Shelby- 59/111= 53.2%  Clanton-49/103=47.6%  Pell City- 36/59 =61%    Level 3: Jefferson-34/143=23.8%  Shelby-23/111=20.7%  Clanton-13/103=12.6%  Pell City-36/59 =61%    Level 2:Jefferson- 25/143=17.5%  Shelby-14/111=12.6%  Clanton-21/103=20.4%  Pell City-5/59=8.5%    Level 1:Jefferson-12/143=8.4%  Shelby -13/111=11.7%  Clanton-20/103=19.4%  Pell City-5/59=8.5%    Level 0:Jefferson-12/143= 8.4%  Shelby-2/111=1.8%  Clanton-0/103= 0%  Pell Ciy-0/59=0% | A new Co-req model is now in place and is being implemented over this year. Content has shifted from 098 to 100, so one of the SLO’s for 098 has changed. Objective 1 is the same objective as in previous years. Only Objectives 2 and 4 have changed.  For Objective 1 we greatly exceeded our goal of 70% performing at level 2 or higher. When comparing the results to last year we have a slight decrease, but still well above 70%. We will continue current instructional methods in teaching this objective due to the success of the students. |
| MTH 098 Objective 2  The student will demonstrate his/her understanding of algebraic manipulations, interpretations, and computations 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 | 89.2% Overall performed at Level 2 or higher  Jefferson:86% at level 2 or higher  Shelby: 81.1% at level 2 or higher  Clanton: 97.1% at level 2 or higher  Pell City: 98.3% at level 2 or higher  Level 4:Jefferson-85/143=59.4%  Shelby-63/111=56.8%  Clanton-61/103=59.2%  Pell City-40/59=67.8%    Level 3:Jefferson-26/143=18.2%  Shelby-7/111=6.3%  Clanton-24/103=23.3%  Pell City-13/59=22%    Level 2:Jefferson-12/143=8.4%  Shelby-20/111=18.0%  Clanton-15/103=14.6%  Pell City-5/59=8.5%  Level 1:Jefferson-8/143=5.6%  Shelby-21/111=18.9%  Clanton-3/103=2.9%  Pell City-1/59=1.7%    Level 0:Jefferson-12/143=8.4%  Shelby-0/111=0%  Clanton-0/103=0%  Pell City-0/59=0% | Objective 2 has changed due to the changes in the content of MTH 098. We greatly exceeded the goal of 70% for Objective 2. We will continue current instructional methods in teaching this objective due to the success of students. |
| 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 writing the equation of a line given appropriate information.  **Plan Submission Date:** | Rubric based assessment of related common final exam problems  Rubric based assessment of related common final exam problems.  **September 19, 2019** | 70% of students learning at a rubric level of 2 or higher  70% of students learning at a rubric level of 2 or higher  **Submitted by:** | 77.9% Overall performed at Level 2 or higher  Jefferson:70.6% at level 2 or higher  Shelby:71.2% at level 2 or higher  Clanton: 92.2% at level 2 or higher  Pell City:83.1% at level 2 or higher  Level 4:Jefferson-62/143=43.4%  Shelby-60/111=54.1%  Clanton-77/103=74.8%  Pell City-40/59=67.8%    Level 3:Jefferson-16/143=11.2%  Shelby-2/111=1.8%  Clanton-5/103=4.9%  Pell City-7/59=11.9%  Level 2:Jefferson-23/143=16.1%  Shelby-17/111=15.3%  Clanton-13/103=12.6%  Pell City-2/59=3.4%  Level 1:Jefferson-20/143=14%  Shelby-22/111=19.8%  Clanton-6/103=5.8%  Pell City-7/59=11.9%  Level 0:Jefferson-22/143=15.4%  Shelby-10/111=9%  Clanton-2/103=1.9%  Pell City-3/59=5.1%  64.9% Overall performed at level 2 or higher  Jefferson: 66.4% at level 2 or higher  Shelby: 51.4% at level 2 or higher  Clanton: 70.9% at level 2 or higher  Pell City:76.3% at level 2 or higher  Level 4:Jefferson-29/143=20.3%  Shelby-16/111=14.4%  Clanton-21/103=20.4%  Pell City-14/59=23.7%  Level 3:Jefferson-25/143=17.5%  Shelby-11/111=9.9%  Clanton-14/103=13.6%  Pell City-24/59=40.7%  Level 2:Jefferson-41/143=28.9%  Shelby-30/111=27%  Clanton-38/103=36.9%  Pell City-7/59=11.9%  Level 1:Jefferson-18/143=12.6%  Shelby-36/111=32.4%  Clanton-16/103=15.5%  Pell City-12/59=20.3%  Level 0:Jefferson-30/143=21%  Shelby-18/111=16.2%  Clanton-14/103=13.6%  Pell City-2/59=3.4%  **Nanette Easterling and Jarrod Cunningham** | Objective 3 is the same as previous years. We again exceeded our goal of 70% for Objective 3 and our rate of success decreased slightly. We will continue to teach using current instructional methods.  Students will continue to be made aware of the availability of tutors in various ways such as email and other media outlets.  Objective 4 has changed this year. The content that this objective measures was previously taught in MTH 100. Since this is the first year this objective is in MTH 098, and we fell below 70%, the department will research best practices for teaching this concept and implement those moving forward.  Students will continue to be made aware of the availability of tutors in various ways such as email and other media outlets. |

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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 | Jefferson Campus   |  |  |  | | --- | --- | --- | | Level 4 | 64/181 | 35.4% | | Level 3 | 31/181 | 17.1% | | Level 2 | 33/181 | 18.2% | | Level 1 | 26/181 | 14.4% | | Level 0 | 27/181 | 14.9% |   Shelby Campus   |  |  |  | | --- | --- | --- | | Level 4 | 150/257 | 58.4% | | Level 3 | 49/257 | 19.1% | | Level 2 | 26/257 | 10.1% | | Level 1 | 14/257 | 5.4% | | Level 0 | 18/257 | 7.0% |   Clanton Campus   |  |  |  | | --- | --- | --- | | Level 4 | 114/198 | 57.6% | | Level 3 | 18/198 | 9.1% | | Level 2 | 33/198 | 16.7% | | Level 1 | 21/198 | 10.6% | | Level 0 | 12/198 | 6.1% |   Pell City   |  |  |  | | --- | --- | --- | | Level 4 | 45/79 | 57.0% | | Level 3 | 9/79 | 11.4% | | Level 2 | 6/79 | 7.6% | | Level 1 | 9/79 | 11.4% | | Level 0 | 10/79 | 12.7% |   Online   |  |  |  | | --- | --- | --- | | Level 4 | 97/236 | 41.1% | | Level 3 | 1/236 | 0.4% | | Level 2 | 83/236 | 35.2% | | Level 1 | 10/236 | 4.2% | | Level 0 | 45/236 | 19.1% |   MTH 099   |  |  |  | | --- | --- | --- | | Level 4 | 5/12 | 41.7% | | Level 3 | 3/12 | 25.0% | | Level 2 | 1/12 | 8.3% | | Level 1 | 0/12 | 0.0% | | Level 0 | 3/12 | 25.0% | | **Annual campus-wide total at rubric level 2 or higher:**  **759/951=79.8%**  There was an increase in the rate of success of 2.9% compared to 2017-2018.  Students will continue to be made aware of the availability of tutors in various ways such as email and other media outlets.  The introduction of MTH 099 helped students who needed the support to be successful in the course. Their average was 75%, performing at a Level 2 or higher. |
| MTH 100 Objective 2  The student will demonstrate his/her understanding of algebraic manipulations, interpretations, and computations by being able to factor a trinomial. | | 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 | 92/181 | 50.8% | | Level 3 | 30/181 | 16.6% | | Level 2 | 30/181 | 16.6% | | Level 1 | 20/181 | 11.0% | | Level 0 | 9/181 | 5.0% |   Shelby Campus   |  |  |  | | --- | --- | --- | | Level 4 | 156/257 | 60.7% | | Level 3 | 47/257 | 18.3% | | Level 2 | 35/257 | 13.6% | | Level 1 | 9/257 | 3.5% | | Level 0 | 10/257 | 3.9% |   Clanton Campus   |  |  |  | | --- | --- | --- | | Level 4 | 134/198 | 67.7% | | Level 3 | 18/198 | 9.1% | | Level 2 | 30/198 | 15.2% | | Level 1 | 10/198 | 5.1% | | Level 0 | 6/198 | 3.0% |   Pell City   |  |  |  | | --- | --- | --- | | Level 4 | 32/79 | 40.5% | | Level 3 | 3/79 | 3.8% | | Level 2 | 2/79 | 2.5% | | Level 1 | 36/79 | 45.6% | | Level 0 | 6/79 | 7.6% |   Online   |  |  |  | | --- | --- | --- | | Level 4 | 118/236 | 50.0% | | Level 3 | 0/236 | 0.0% | | Level 2 | 86/236 | 36.4% | | Level 1 | 10/236 | 4.2% | | Level 0 | 22/236 | 9.3% | |  |  |  |   MTH 099   |  |  |  | | --- | --- | --- | | Level 4 | 9/12 | 75.0% | | Level 3 | 1/12 | 8.3% | | Level 2 | 0/12 | 0.0% | | Level 1 | 2/12 | 16.7% | | Level 0 | 0/12 | 0.0% | | **Annual campus-wide total at rubric level 2 or higher:**  **813/951 = 85.5%**  This objective was a part of MTH 098 SLO last year. There was an increase in the rate of success of  15.7 % compared to 2017-2018, indicating success in current instructional methods.  Students will continue to be made aware of the availability of tutors in various ways such as email and other media outlets.  The introduction of MTH 099 helped students who needed the support to be successful in the course. Their average was 83.3%, performing at a Level 2 or higher. |
| 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 | Jefferson Campus   |  |  |  | | --- | --- | --- | | Level 4 | 74/181 | 40.9% | | Level 3 | 21/181 | 11.6% | | Level 2 | 42/181 | 23.2% | | Level 1 | 28/181 | 15.5% | | Level 0 | 16/181 | 8.8% |   Shelby Campus   |  |  |  | | --- | --- | --- | | Level 4 | 117/257 | 45.5% | | Level 3 | 45/257 | 17.5% | | Level 2 | 48/257 | 18.7% | | Level 1 | 26/257 | 10.1% | | Level 0 | 21/257 | 8.2% |   Clanton Campus   |  |  |  | | --- | --- | --- | | Level 4 | 39/198 | 19.7% | | Level 3 | 34/198 | 17.2% | | Level 2 | 52/198 | 26.3% | | Level 1 | 43/198 | 21.7% | | Level 0 | 30/198 | 15.2% |   Pell City   |  |  |  | | --- | --- | --- | | Level 4 | 33/79 | 41.8% | | Level 3 | 5/79 | 6.3% | | Level 2 | 7/79 | 8.9% | | Level 1 | 20/79 | 25.3% | | Level 0 | 14/79 | 17.7% |   Online   |  |  |  | | --- | --- | --- | | Level 4 | 76/236 | 32.2% | | Level 3 | 0/236 | 0.0% | | Level 2 | 103/236 | 43.6% | | Level 1 | 10/236 | 4.2% | | Level 0 | 47/236 | 19.9% |   MTH 099   |  |  |  | | --- | --- | --- | | Level 4 | 1/12 | 8.3% | | Level 3 | 1/12 | 8.3% | | Level 2 | 1/12 | 8.3% | | Level 1 | 5/12 | 41.7% | | Level 0 | 4/12 | 33.3% | | **Annual campus-wide total at rubric level 2 or higher: 696/951 = 73.2%**  There was a decrease in the rate of success of 4.7% compared to 2017-2018, but we still met the goal of 70%. This objective continues to be a challenge to most students, but the criterial for success was met. We will need to focus more on scaffolding students on this process so that it will lead to greater mastery.  Students will continue to be made aware of the availability of tutors in various ways such as email and other media outlets.  The introduction of MTH 099 helped students who needed the support to be successful in the course. Their average was 25.0%, performing at a Level 2 or higher. We can see that the MTH 099 students really struggled with this topic. We will have to scaffold the students better so that they can achieve mastery of it. |
| 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 | Jefferson Campus   |  |  |  | | --- | --- | --- | | Level 4 | 70/181 | 38.7% | | Level 3 | 39/181 | 21.5% | | Level 2 | 32/181 | 17.7% | | Level 1 | 25/181 | 13.8% | | Level 0 | 15/181 | 8.3% |   Shelby Campus   |  |  |  | | --- | --- | --- | | Level 4 | 138/257 | 53.7% | | Level 3 | 51/257 | 19.8% | | Level 2 | 27/257 | 10.5% | | Level 1 | 26/257 | 10.1% | | Level 0 | 15/257 | 5.8% |   Clanton Campus   |  |  |  | | --- | --- | --- | | Level 4 | 56/198 | 28.3% | | Level 3 | 69/198 | 34.8% | | Level 2 | 47/198 | 23.7% | | Level 1 | 17/198 | 8.6% | | Level 0 | 9/198 | 4.5% |   Pell City   |  |  |  | | --- | --- | --- | | Level 4 | 18/79 | 22.8% | | Level 3 | 22/79 | 27.8% | | Level 2 | 8/79 | 10.1% | | Level 1 | 27/79 | 34.2% | | Level 0 | 4/79 | 5.1% |   Online   |  |  |  | | --- | --- | --- | | Level 4 | 121/236 | 51.3% | | Level 3 | 2/236 | 0.8% | | Level 2 | 82/236 | 34.7% | | Level 1 | 5/236 | 2.1% | | Level 0 | 26/236 | 11.0% |   MTH 099   |  |  |  | | --- | --- | --- | | Level 4 | 0/12 | 0.0% | | Level 3 | 5/12 | 41.7% | | Level 2 | 1/12 | 8.3% | | Level 1 | 5/12 | 41.7% | | Level 0 | 1/12 | 8.3% | | **Annual campus-wide total at rubric level 2 or higher:**  **782/951 = 82.2%**  There was a significant increase in the rate of success as compared to the 2017-2018 academic year of 6.5%, indicating success in current instructional methods. 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.  The introduction of MTH 099 helped students who needed the support to be successful in the course. Their average was 50%, performing at a Level 2 or higher. |
| MTH 100 Objective 5  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 | Jefferson Campus   |  |  |  | | --- | --- | --- | | Level 4 | 103/181 | 56.9% | | Level 3 | 42/181 | 23.2% | | Level 2 | 20/181 | 11.0% | | Level 1 | 10/181 | 5.5% | | Level 0 | 6/181 | 3.3% |   Shelby Campus   |  |  |  | | --- | --- | --- | | Level 4 | 180/257 | 70.0% | | Level 3 | 11/257 | 4.3% | | Level 2 | 45/257 | 17.5% | | Level 1 | 13/257 | 5.1% | | Level 0 | 8/257 | 3.1% |   Clanton Campus   |  |  |  | | --- | --- | --- | | Level 4 | 81/198 | 40.9% | | Level 3 | 54/198 | 27.3% | | Level 2 | 55/198 | 27.8% | | Level 1 | 6/198 | 3.0% | | Level 0 | 2/198 | 1.0% |   Pell City   |  |  |  | | --- | --- | --- | | Level 4 | 25/79 | 31.6% | | Level 3 | 26/79 | 32.9% | | Level 2 | 4/79 | 5.1% | | Level 1 | 20/79 | 25.3% | | Level 0 | 4/79 | 5.1% |   Online   |  |  |  | | --- | --- | --- | | Level 4 | 93/236 | 39.4% | | Level 3 | 2/236 | 0.8% | | Level 2 | 95/236 | 40.3% | | Level 1 | 7/236 | 3.0% | | Level 0 | 39/236 | 16.5% |   MTH 099   |  |  |  | | --- | --- | --- | | Level 4 | 7/12 | 58.3% | | Level 3 | 4/12 | 33.3% | | Level 2 | 1/12 | 8.3% | | Level 1 | 0/12 | 0.0% | | Level 0 | 0/12 | 0.0% | | **Annual campus-wide total at rubric level 2 or higher:**  **836/951 = 87.9%**  This objective was a part of MTH 098 SLO last year.  There was a significant increase in the rate of success as compared to the 2017-2018 academic year of 8.6 %, indicating success in current instructional methods. 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.  The introduction of MTH 099 helped students who needed the support to be successful in the course. Their average was 100%, performing at a Level 2 or higher. |
| **Plan submission date: September 19, 2019** | | | | **Submitted by: J. Brandon Darby** | |

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| **Instructional Program Outcomes & Assessment Plan – MTH 110**  **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. 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 |

**SLO material was not assessed and submitted (see chart for instructor assignment)**

**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.

**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 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. | | | | |
| **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 | Jefferson Campus  Level 4 23/46 50.0%  Level 3 6/46 13.0%  Level 2 4/46 8.7%  Level 1 7/46 15.2%  Level 0 6/46 13.0%  Shelby Campus  Level 4 145/210 69.0%  Level 3 20/210 9.5%  Level 2 18/210 8.6%  Level 1 19/210 9.0%  Level 0 8/210 3.8%  Clanton Campus  Level 4 23/68 33.8%  Level 3 12/68 17.6%  Level 2 8/68 11.8%  Level 1 15/68 22.1%  Level 0 10/68 14.7% | 72.1% schoolwide performed at level 2 or higher. (328/455)  This is a 5.3% increase over last year, 2017-2018.  Our students perform well on this objective, indicating current instructional methods are meeting our success goal. The Division may want to continue using this objective in an effort to improve student performance, thus continuing to exceed our 70% goal. |

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|  |  |  | Pell City  Level 4 14/40 35.0%  Level 3 16/40 40.0%  Level 2 4/40 10.0%  Level 1 4/40 10.0%  Level 0 2/40 5.0%  Online  Level 4 25/91 27.5%  Level 3 2/91 2.2%  Level 2 8/91 8.8%  Level 1 29/91 31.9%  Level 0 27/91 29.7% |  |
| **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. | 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 16/46 34.8%  Level 3 5/46 10.9%  Level 2 11 /46 23.9%  Level 1 10/46 21.7%  Level 0 4/46 8.7%  Shelby Campus  Level 4 121/211 57.3%  Level 3 29/211 13.7%  Level 2 28/211 13.3%  Level 1 23/211 10.9%  Level 0 10/211 4.7%  Clanton Campus  Level 4 34/68 50.0%  Level 3 2/68 2.9%  Level 2 11/68 16.2%  Level 1 15/68 22.1%  Level 0 6/68 8.8% | 70.8% schoolwide performed at level 2 or higher. (323/456)  This is a 10.3% increase over last year, 2017-2018.  Our students perform well on this objective, indicating current instructional methods are meeting our success goal.  The Division may want to continue using this objective in an effort to improve student performance, thus continuing to exceed our 70% goal. |

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|  |  |  | Pell City  Level 4 16/40 40.0%  Level 3 3/40 7.5%  Level 2 4/40 10.0%  Level 1 14/40 35.0%  Level 0 3/40 7.5%  Online  Level 4 10/91 11.0%  Level 3 3/91 3.3%  Level 2 30/91 33.0%  Level 1 24/91 26.4%  Level 0 24/91 26.4% |  |

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| **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 | 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 12/46 26.1%  Level 3 11/46 23.9%  Level 2 11/46 23.9%  Level 1 6/46 13.0%  Level 0 6/46 13.9%  Shelby Campus  Level 4 107/210 51.0%  Level 3 31/210 14.8%  Level 2 23/210 11.0%  Level 1 16/210 7.6%  Level 0 33/210 15.7%  Clanton Campus  Level 4 16/68 23.5%  Level 3 11/68 16.2%  Level 2 18/68 26.5%  Level 1 17/68 25.0%  Level 0 6/68 8.8%  Pell City  Level 4 10/40 25.0%  Level 3 18/40 45.0%  Level 2 8/40 20.0%  Level 1 2/40 5.0%  Level 0 2/40 5.0%  Online  Level 4 4/91 4.4%  Level 3 22/91 24.2%  Level 2 11/91 12.1%  Level 1 25/91 27.5%  Level 0 29/91 31.9% | 68.8% schoolwide performed at level 2 or higher. (313/455)  This is a 3.2% increase over last year, 2017-2018.  Our test question tested a higher level of complexity that is not required to demonstrate proficiency in this objective. The Division may want to consider  modifying the question to better assess the stated objective. |
| **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 | Jefferson Campus  Level 4 18/46 39.1%  Level 3 13/46 28.3%  Level 2 4/46 8.7%  Level 1 6/46 13.0%  Level 0 5/46 10.9%  Shelby Campus  Level 4 149/211 70.6%  Level 3 24/211 11.4%  Level 2 22/211 10.4%  Level 1 14/211 6.6%  Level 0 2/211 0.9%  Clanton Campus  Level 4 30/68 44.1%  Level 3 15/68 22.1%  Level 2 16/68 23.5%  Level 1 4/68 5.9%  Level 0 3/68 4.4%  Pell City  Level 4 30/40 75.0%  Level 3 6/40 15.0%  Level 2 1/40 2.5%  Level 1 3/40 7.5%  Level 0 0/40 0.0%  Online  Level 4 22/91 24.2%  Level 3 27/91 29.7%  Level 2 15/91 16.5%  Level 1 14/91 15.4%  Level 0 13/91 14.3% | 86.0% schoolwide performed at level 2 or higher. (392/456)  This is a 0.9% increase over last year, 2017-2018.  Our students perform well on this objective, indicating current instructional methods are meeting our success goal. The Division may want to retire and replace this objective, as it has consistently exceeded, by double digits, our 70% goal. |
| **Plan submission date: 9/16/2019** | | | **Submitted by: Peggy Thrasher**  **Yu-ing Hargett** | |

**SLO material was not assessed and submitted (see chart for instructor assignment)**

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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 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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| **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 7/10 70%  Level 3 0/10 0%  Level 2 2/10 20%  Level 1 0/10 0%  Level 0 1/10 10%  **Shelby Campus**  Level 4 13/19 68.42%  Level 3 0/19 0%  Level 2 6/19 31.58%  Level 1 0/19 0%  Level 0 0/19 0%  **Online**  Level 4 63/79 79.75%  Level 3 0/79 0%  Level 2 6/79 7.59%  Level 1 0/79 0%  Level 0 10/79 12.66%  **Overall Performance**  Level 4 83/108 76.85%  Level 3 0/108 0%  Level 2 14/108 12.96%  Level 1 0/108 0%  Level 0 11/108 10.19% | 89.81% (97/108) of the students performed at level 2 or higher. This is up from the 84.75% that performed at level 2 or higher last year. Performance in the online sections is higher than performance in the traditional sections. Poor attendance was observed in traditional MTH 116 classes by one instructor. This may suggest that a flexible learning environment is more conducive to learning for this population of students. A solution to aid students who are unable to attend regularly are recorded lectures and online notes. This suggestion will be offered to instructors who teach MTH 116 as recommended strategy for improvement. |
| **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 6/10 60%  Level 3 0/10 0%  Level 2 2/10 20%  Level 1 0/10 0%  Level 0 2/10 20%  **Shelby Campus**  Level 4 13/19 68.42%  Level 3 0/19 0%  Level 2 6/19 31.58%  Level 1 0/19 0%  Level 0 0/19 0%  **Online**  Level 4 46/79 58.23%  Level 3 0/79 0%  Level 2 21/79 26.58%  Level 1 0/79 0%  Level 0 12/79 15.19%  **Overall Performance**  Level 4 65/108 60.19%  Level 3 0/108 0%  Level 2 29/108 26.85%  Level 1 0/108 0%  Level 0 14/108 12.96% | 87.04% (94/108) of students performed at level 2 or higher. This is down from the 89.83% that performed at level 2 or higher last year. It should be noted that online success for this problem lags considerably behind traditional classroom success. The online success rate is 84.81% (67/79) while the traditional success rate is 93.1% (27/29). This problem requires that students connect two ideas, volume and capacity, and not only perform the calculation to obtain the volume of a container but then convert the volume to a capacity. This requires two formulas located in two different sections of the text. The relationship between volume and capacity may be more clearly communicated in class. To increase online student success, instructor created tutorial videos addressing the connection between these two ideas should be created and made available to online students. |
| **Assessment of Objective 3**  Calculate percentage. | 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 5/10 50%  Level 3 0/10 0%  Level 2 3/10 30%  Level 1 0/10 0%  Level 0 2/10 20%  **Shelby Campus**  Level 4 13/19 68.42%  Level 3 0/19 0%  Level 2 6/19 31.58%  Level 1 0/19 0%  Level 0 0/19 0%  **Online**  Level 4 43/79 54.43%  Level 3 0/79 0%  Level 2 24/79 30.38%  Level 1 0/79 0%  Level 0 12/79 15.19%  **Overall Performance**  Level 4 61/108 56.48%  Level 3 0/108 0%  Level 2 33/108 30.56%  Level 1 0/108 0%  Level 0 14/108 12.96% | 87.04% (94/108) of students performed at level 2 or higher. This is slightly lower than last year’s success rate. The supplemental material distributed as a result of last year’s analysis didn’t prove fruitful. One instructor noted that it appears that students struggle with relating written words with algebraic representation. More emphasis will be given to connecting English phrases with mathematical\algebraic representations. |
| **Plan submission date: 9/17/19** | **Submitted by: J. Holley** | |  |  |
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| **Instructional Program Outcomes & Assessment Plan – MTH 120**  **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. 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 |

**SLO material was not assessed and submitted (see chart for instructor assignment)**

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| **Instructional Program Outcomes & Assessment Plan – MTH 125S**  **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. Solve a limit problem. 2. Compute a derivative.   3. Compute an indefinite integral. |

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| **Intended Outcomes** | **Means of Assessment** | **Criteria for Success** | **Summary & Analysis of Assessment Evidence** | **Use of Results** |
| MTH 125S Objective 1  The student will demonstrate knowledge of the methods presented in this course by his/her ability to calculate the limit of a function. | 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 10/19 52.6%  Level 3 7/19 36.8%  Level 2 2/19 10.6%  Level 1 0/19 0.0%  Level 0 0/19 0.0%  Shelby Campus  Level 4 70/86 81.4%  Level 3 3/86 3.5%  Level 2 11/86 12.8%  Level 1 2/86 2.3%  Level 0 0/86 0.0%  Clanton Campus  Level 4 3/10 30.0%  Level 3 0/10 0.0%  Level 2 5/10 50.0%  Level 1 2/10 20.0%  Level 0 0/10 0.0% | 96.5% (111/115) performed at Level 2 or higher. Up from 95.0% of last year.  The small increase could possibly be attributed to statistical variation between measurement cycles to afford meaningful comparison. However, a more empirical approach has been implemented this academic year in teaching limits with an increase in practice examples and problems. |
| MTH 125S Objective 2  The student will demonstrate knowledge of the methods presented in this course by his/her ability to compute the 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 | Jefferson Campus  Level 4 8/19 42.1%  Level 3 8/19 42.1%  Level 2 3/19 15.8%  Level 1 0/19 0.0%  Level 0 0/19 0.0%  Shelby Campus  Level 4 69/86 80.2%  Level 3 8/86 9.3%  Level 2 4/86 4.7%  Level 1 3/86 3.5%  Level 0 2/86 2.3%  Clanton Campus  Level 4 10/10 100.0%  Level 3 0/10 0.0%  Level 2 0/10 0.0%  Level 1 0/10 0.0%  Level 0 0/10 0.0% | 95.6% (110/115) performed at Level 2 or higher. Up from 93% of previous year.  Students traditional perform better on derivatives because of the formulization of the rules for finding the derivative of a function.  One variable that contributes to the changes in performance fractions is the use of formulas for derivatives during testing. Our recommendation is to consider the possible homogenization of the formula package that students can use during testing, for future assessments. |
| MTH 125S Objective 3  The student will demonstrate knowledge of the methods presented in this course by his/her ability to compute an indefinite integral. | 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 8/19 42.1%  Level 3 6/19 31.6%  Level 2 3/19 15.8%  Level 1 2/19 10.5%  Level 0 0/19 0.0%  Shelby Campus  Level 4 48/86 55.8%  Level 3 26/86 30.2%  Level 2 9/86 10.5%  Level 1 3/86 3.5%  Level 0 0/86 0.0%  Clanton Campus  Level 4 8/10 80.0%  Level 3 2/10 20.0%  Level 2 0/10 0.0%  Level 1 0/10 0.0%  Level 0 0/10 0.0% | 95.6% performed at Level 2 or higher. Down from 98% of previous year.  Indefinite integration is traditionally a more challenging topic than differentiation. It is not unexpected that between academic cycles results may differ. The demographic of the student population includes students who may have been away from school and mathematics courses for over ten years. Returning adults, generally dedicated to their studies, find it however, more challenging to overcome some of their prerequisite deficiencies.  Generally, concept and topic retention presents a challenge for most students so it is recommended that abridged repetition of prerequisite topics and practice problems be used as learning augmentation. |

Submitted by: Konstantino Theodorou Sept. 19, 2019

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| **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. | | | | |
| **Intended Outcomes** | **Means of Assessment** | **Criteria for Success** | **Summary & Analysis of Assessment Evidence** | **Use of Results** | |
| MTH 227 Objective 1  The student will demonstrate knowledge of the methods presented in this course by his/her ability to find the equation of a plane. | 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 7/22 32%  Level 3 7/22 32%  Level 2 6/22 27%  Level 1 2/22 9%  Level 0 0/22 0%  Shelby Campus  Level 4 10/25 40%  Level 3 7/25 28%  Level 2 6/25 24%  Level 1 2/25 8%  Level 0 0/25 0% | 91% (43/47) performed at Level 2 or higher. Down slightly from 95% last year. The overall percentage of students that scored at level 2 or higher decreased slightly this academic year. Our recommendation is add some additional practice problems involving cross products and finding the equation of a point from three given points. | |
| 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 | Jefferson Campus  Level 4 7/22 32%  Level 3 8/22 36%  Level 2 4/22 18%  Level 1 3/22 14%  Level 0 0/22 0%  Shelby Campus  Level 4 12/25 48%  Level 3 5/25 20%  Level 2 5/25 20%  Level 1 2/25 8%  Level 0 1/25 4% | 87% (41/47) performed at Level 2 or higher. Down from 97% last year. The overall percentage of students that scored at level 2 or higher decreased this academic year. Our recommendation is to practice more with the gradient operator and dot products. | |
| MTH 227 Objective 3  The student will demonstrate knowledge of the methods presented in this course by his/her ability set up and evaluate a double integral. | 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 5/22 22%  Level 3 8/22 36%  Level 2 7/22 32%  Level 1 1/22 5%  Level 0 1/22 5%  Shelby Campus  Level 4 9/25 36%  Level 3 7/25 28%  Level 2 5/25 20%  Level 1 3/25 12%  Level 0 1/25 4% | 87% (41/47) performed at Level 2 or higher. Down from 93% last year. The overall percentage of students that scored at level 2 or higher decreased this academic year. Our recommendation is add some additional practice problems involving finding limits for a given region and computing multiple integrals. | |

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| **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 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 | Jefferson Campus Level 4 2/6 33% Level 3 3/6 50% Level 2 1/6 17% Level 1 0/6 0% Level 0 0/6 0%  Shelby Campus Level 4 5/17 29% Level 3 6/17 53% Level 2 5/17 29% Level 1 1/17 6% Level 0 0/17 0% | 96% (22/23) performed at Level 2 or higher. Up from 85% last year. The overall percentage of students that scored at level 2 or higher increased during this academic year. Our recommendation is to continue to add additional homework problems to strengthen basic math skills such as logarithms and integrals. |
| 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 | Jefferson Campus Level 4 3/6 50% Level 3 2/6 33% Level 2 1/6 17% Level 1 0/6 0% Level 0 0/6 0%  Shelby Campus Level 4 5/17 29.4% Level 3 5/17 29.4% Level 2 5/17 29.4% Level 1 2/17 11.8% Level 0 0/17 0% | 91% (19/23) performed at Level 2 or higher. Up from 85% last year. The overall percentage of students that scored at level 2 or higher increased this academic year. Our recommendation is to continue to supplement the homework with some practice in solving basic polynomial equations as they learned in precalculus similar to what they need for this class. |
| 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 | Jefferson Campus Level 4 1/6 17% Level 3 4/6 66% Level 2 0/6 0% Level 1 1/6 17% Level 0 0/6 0%  Shelby Campus  Level 4 7/17 41% Level 3 5/17 30% Level 2 3/17 17% Level 1 1/17 6% Level 0 1/17 6% | 87% (20/23) performed at Level 2 or higher. Up slightly from 85% last year. The overall percentage of students that scored at level 2 or higher increased this academic year. Our recommendation is to continue to add more examples of problems that address partial fraction decomposition. |

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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 their work and will be graded on the quality of their technique, notation, and accuracy.  The student will demonstrate knowledge of statistics by his/her ability to  1. Calculate variance and standard deviation for a set of sample data  2. Estimate an interval for the true mean from a set of sample data  3. Set up and conduct a statistical test for the mean | | | | |
| **Intended Outcomes** | **Means of Assessment** | **Criteria for Success** | **Summary & Analysis of Assessment Evidence** | **Use of Results** |
| MTH 265 Objective 1  The student will demonstrate knowledge of the methods presented in this course by his/her ability to calculate the variance and standard deviation of a set of sample date. | 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 1/1 100%  Level 3 0/1 0%  Level 2 0/1 0%  Level 1 0/1 0%  Level 0 0/1 0%  Shelby Campus  Level 4 7/13 54%  Level 3 6/13 46%  Level 2 0/13 0%  Level 1 0/13 0%  Level 0 0/13 0% | 100% (14/14) performed at Level 2 or higher. Up from 89.4% last year. Unfortunately, six sections of this course have not reported data and the yearly results are based on a single Video Conference section of 14 students. The apparent homoscedasticity in the data is a consequence of the small data sample. However, it does confirm the conventional wisdom that smaller size classes typically outperform larger scale classes as interactive instruction is increased.  Our recommendation is not to change anything at this point but try to recover missing data to incorporate into the three-year report in order to optimize the assessment. |
| MTH 265 Objective 2  The student will demonstrate knowledge of the methods presented in this course by his/her ability to 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 | Jefferson Campus  Level 4 1/1 100%  Level 3 0/1 0%  Level 2 0/1 0%  Level 1 0/1 0%  Level 0 0/1 0%  Shelby Campus  Level 4 6/13 46%  Level 3 5/13 38%  Level 2 2/13 16%  Level 1 0/13 0%  Level 0 0/13 0% | 100% (14/14) performed at Level 2 or higher. Up from 93.5% last year. Again, insufficient data points to provide meaningful comparison with last year’s assessment.  One interesting observation, however, may be the significant reduction in Level 4 performance from last year. Last year’s results were  Level 4 - 107/152 70.39%  Level 3 - 15/152 9.80%  Level 2 - 23/152 15.13%  Level 1 - 7/152 4.60%  Level 0 - 0/152 0.00%  indicating a significant reduction of 25% in the fraction of students that performed at level 4 this year.  Our recommendation is to ascertain if the difference is minimized when additional data is recovered or collected. |
| MTH 265 Objective 3  The student will demonstrate knowledge of the methods presented in this course by his/her ability 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 | Jefferson Campus  Level 4 1/1 100%  Level 3 0/1 0%  Level 2 0/1 0%  Level 1 0/1 0%  Level 0 0/1 0%  Shelby Campus  Level 4 5/13 38%  Level 3 6/13 46%  Level 2 2/13 16%  Level 1 0/13 0%  Level 0 0/13 0% | 100% (14/14) performed at Level 2 or higher. Up from 81.8% of last year.  Insufficient data to validate the difference in performance and outcome between the 2017-2018 and 2018-2019 academic years.  Our overall recommendation is to prioritize the collection of data from all participating sections to facilitate meaningful student performance and outcome comparisons. |

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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 response.  **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. |

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| **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 questions. | 70% of students learning at a rubric level of 3 or higher | **Shelby campus (1 course )**  Fall 2018  Level 4: 4%  Level 3: 4%  Level 2: 65%  Level 1: 19%  Level 0: 8%  Summer 2019 ( online)  Of 22 attempts:  12 earned 8 of 8 possible points  6 earned 6 of 8 possible points  1 earned 5 of 8 points  0 earned 2 of 8 points  3 students earned 0 points.  This indicates that 86.3 % of students demonstrated mastery of this question  on the final exam. | | This material was submitted by two adjunct instructors.  Fall 2018 was a traditional course. Summer 2019 was an online course.  No other material was submitted for the 2018-2019 year. |
| 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 questions. | 70% of students learning at a rubric level of 3 or higher | **Shelby Campus**  Fall 2018 ( 1 course)  Level 4- 6%  Level 3: 0%  Level 2: 38%  Level 1: 6%  Level 0- 50%  Summer 2019 ( 1 course)  Of 22 attempts:  12 earned 8 of 8 possible points  4 earned 6 of 8 possible points  2 earned 4 of 8 points  1 earned 3 of 8 points  1 earned 2 of 8 points  2 students earned 0 points.  This indicates that 82% of students demonstrated mastery of this  question  on the final exam. | |  |
| 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 | **Shelby campus**  Fall 2018 ( 1 course)  No data submitted by instructor  Summer 2019  No data submitted by instructor | |  |
| **Plan submission date: September 202019** | | | | **Compiled by: Kevin S. Townes** | |

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| **Course Student Learning Outcomes & Assessment Plan PHY 201 General Physics with Trigonometry**  General Education Outcome  1. 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.  2. Offer an appropriate developmental mathematics program accommodating various skill levels.  3. Develop and provide courses relevant to the career and professional degree programs of the college.  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 below. |

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|  | 3 points | 2 points | 1 point | 0 points |
| **Physics approach** | The physics approach is appropriate and complete | The physics approach contains minor omissions or errors | Some concepts and principles of the physics approach are missing/or inappropriate | Most physics approach is missing and/or inappropriate |
| **Specific Application of physics** | The specific application of physics is appropriate and complete | The specific application of physics contains minor omissions or errors | Parts of the specific application of physics are missing and/or contain errors | Most of the specific application of physics is missing and/or contains errors |
| **Mathematical procedure** | The mathematical procedures are appropriate and complete | Appropriate mathematical procedures are used with minor omissions or errors | Parts of the mathematical procedures are missing and/or contains errors | Most of the mathematical procedures are missing and/or contain errors |
| **Logical progress** | The entire solution is clear, focused and logically connected | The solution is clear and focused with minor inconsistencies | Parts of the solution are unclear, unfocused, and/or inconsistent | Most of the solution parts are unclear, unfocused, and/or inconsistent |

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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 2018 & Spring 2019 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 2018 — 1 section / 3 Students, Spring 2018 No section  12 final exam questions related to the three objectives were assessed, and the number of solutions at each rubric level identified.   * 15 responses to problems related to objective 1 were assessed. * 9 responses to problems related to objective 2 were assessed. * 12 responses to problems related to objective 3 were assessed.   Level 3 – 25 (69.4%)  Level 2 - 3 (8.4%)  Level 1 – 4 (11.1%)  Level 0 – 4 (1%)  69.4% of solutions related to PHY201 objectives 1-3 were assessed at rubric level 2 or higher. | 69.4% of solutions related to PHY201 objectives 1-3 were assessed at rubric level 2 or higher which is close to the success criteria set by the department. This is better than the previous assessment of 63.2%. To improve the situation as it was noted in the last assessment, there is a need to:  1. Make sure that the students taking the course have the required pre-requisite mathematics courses.  2. Ensure that the assessment focuses on the goal of students developing problem solving, conceptual understanding and critical thinking skills rather than calculational skills.  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 2018 – Spring 2019  Number of Students Assessed  Fall 2018-Spring 2019, 1 section / 3 Students  15 responses to related final exam questions were assessed, and the number of solutions at each rubric level identified.  Level 3 — 10 (66.7%)  Level 2 — 1 (6.7%)  Level 1— 2 (13.3%)  Level 0 — 2 (13.3%)  73% of solutions related to PHY 201 objective 1 were assessed at rubric level 2 or higher. | 73% of solutions related to PHY 201 objective 1 were assessed at rubric level 2 or higher which is above the criteria for success. This is better than that of the previous year.  26.6% at levels 0 and 1 combined, is high. Fundamental ideas of the 2nd law of Newton must be emphasized. At least 5 multi-steps problems using Newton’s Laws of motion with emphasis on the use of the results of Physics Education Research must be worked out every term. |
| 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 2018 – Spring 2019  Number of Students Assessed  Fall 2018-Spring 2019, 1 section / 3 Students  9 responses to related final exam questions were assessed, and the number of solutions at each rubric level identified.  Level 3 — 8(88.8%)  Level 2 — 1(11.1%)  Level 1— 0 (0.0%)  Level 0 — 0 (0.0%)  100% of solutions related to PHY 201 objective 2 were assessed at rubric level 2 or higher. | 100% of solutions related to PHY 201 objective 2 were assessed at rubric level 2 or higher.  Even though the goal is met, it is necessary to review Energy & Momentum around the end of the term. Students have tendency to forget the concepts discussed earlier in the term.  It is also worthwhile to mention that the small size of the class played a major role in this performance. |
| 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 2018 - Spring 2019  Number of Students Assessed  Fall 2018-Spring 2019, 1 section / 3 Students  12 responses to related final exam questions were assessed, and the number of solutions at each rubric level identified.  Level 3 — 7 (58.3%)  Level 2 — 1 (8.3%)  Level 1— 2 (16.6%)  Level 0 — 2 (16.6%)  66.6% of solutions related to PHY 201 objective 3 were assessed at rubric level 2 or higher. | 66.6% of solutions related to PHY 201 objective 3 were assessed at rubric level 2 or higher which is close to the expected criteria for success. This is slightly better than last period’s results.  Must be able to cover the concepts of Bernoulli’s principle. Again, high percentages at levels 0 and 1 (combined 33.2%) must be improved.  Must have the students understand better the Bernoulli’s principle. A set of 10 problems were given for them to work out.    This activity should be followed in the future offerings. |
| **Plan submission date: 6/28/2019** | | | **Submitted by: Ali Yazdi** | |

Comments: Below the expectations results of < 70% for PHY 201 reflects poor mathematical preparations of the students. The following recommendations could improve the results:

1. Strictly enforce Pre-requisite requirements.
2. Mathematical requirements be discussed in the beginning of the term.

Also, it is worthwhile to mention that in this cycle (16-19) with the help of IT, Maintenance, Administration and Office of Grants and Public Relations, the Physics laboratory went through major renovations and updated equipment. The Physics Laboratory experiments are now in a better position to promote self-discovery and active engagement to help build the students’ self-confidence, problem solving, as well as critical thinking skills.

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| |  | | --- | | **Course Student Learning Outcomes & Assessment Plan** |   **PHY 213 S General Physics with Calculus I**  General Education Outcome  Students will use abstract ideas, symbols, and fundamental skills of mathematics to analyze and solve problems.  Departmental 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. Solve projectile motion problems. 2. State and apply Newton’s second law 3. Calculate potential energy in the gravitational field.   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** |
| PHY 213S Objective 1  Solve projectile motion problems. | Rubric based assessment of related final exam problems | At least 70% of students will produce solutions at rubric level 2 or higher. | Jefferson Campus Level 3 24/52 47% Level 2 14/52 27% Level 1 7/52 13%  Level 0 7/52 13%  Shelby Campus No Class Offered | Conclusions/Recommendations  Based on Fall 2018 through Summer 201 Data  Instructor Comments:  For problem 1 (38/52) 74% of students performed at at level 2 or higher. Most students were able to solve the problem demonstrating the physics and mathematics. This small group shows that projectile motion is well understood but still emphasis on details is essential towards the end of the term. Looks like they have a tendency to forget what they learned a few weeks earlier. |
| PHY 213S Objective 2  State and Apply Newton’s second law. | Rubric based assessment of related final exam problems | At least 70% of students will produce solutions at rubric level 2 or higher. | Jefferson Campus (Prob 2) Level 3 32/52 62% Level 2 10/52 19% Level 1 7/52 13%  Level 0 3/52 6%  Jefferson Campus (Prob 3) Level 3 23/52 44% Level 2 19/52 37% Level 1 6/52 12%  Level 0 4/52 7%  Shelby Campus No Class Offered | Conclusions/Recommendations  Based on Fall 2018 through Summer 201 Data  Instructor Comments:  For problem 2 (42/52) 81% of students and for problem 3 (42/52) 81% of students performed at level 2 or higher. Most students were able to solve the problem demonstrating understanding of the physics and the mathematics. It is hard to make a judgement when the group is so small, nonetheless, more elaborate dynamics problems needed to be worked out. Newton’s 2nd Law is well understood. More challenging problems should be given. |
| PHY 213S Objective 3  Calculate potential energy in the gravitational field. | Rubric based assessment of related final exam problems | At least 70% of students will produce solutions at rubric level 2 or higher. | Jefferson Campus (Prob 4) Level 3 36/52 69% Level 2 8/52 15% Level 1 3/52 6%  Level 0 5/52 10%  Jefferson Campus (Prob 5) Level 3 36/52 69% Level 2 9/52 17% Level 1 3/52 6%  Level 0 4/52 8%  Shelby Campus No Class Offered | Conclusions/Recommendations  Based on Fall 2018 through Summer 201 Data  Instructor Comments: For problem 4 (44/52) 84% of students and for problem 5 (45/52) 86% of students performed at level 2 or higher. Most students were able to solve the problem demonstrating understanding of the physics and the mathematics. Familiarity with integration and differentiations are evident. More challenging problems should be given. Even though most students are familiar with integration and differentiation. More challenging as well as more concise problems should be given. |
| **Plan submission date:**  9/27/2019 | | | **Submitted by: Department of Mathematics, Engineering and Physical Sciences, Robert Wallace** | |

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| **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 2018 through summer 2019.  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 | Jefferson Campus Level 3 12/28 42% Level 2 8/28 29% Level 1 8/28 29%  Shelby Campus No Class Offered | 71% (20/28) performed at Level 2 or higher. Down from 84% last year. The overall percentage of students that scored at level 2 or higher decreased. Our recommendation is to offer some additional practice problems on electric fields. |
| 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 | Jefferson Campus Level 3 14/28 50% Level 2 10/28 36% Level 1 4/28 14%  Shelby Campus No Class Offered | 86% (24/28) performed at Level 2 or higher. Up slightly from 84% last year. The overall percentage of students that scored at level 2 or higher increased slightly this academic year. Our recommendation is to continue to offer some additional practice problems on magnetic fields. |
| PHY 214S Objective 3  The student will demonstrate knowledge of electromagnetic theory by his/her ability to solve problems that involve electric circuits. | Rubric based assessment of related common final exam problems | 70% of students learning at a rubric level of 2 or higher | Jefferson Campus Level 3 13/28 47% Level 2 11/28 39% Level 1 4/28 14%  Shelby Campus No Class Offered | 86% (24/28) performed at Level 2 or higher. Down from 92% last year. The overall percentage of students that scored at level 2 or higher decreased during this academic year. Our recommendation is to continue to offer some additional practice problems on electric circuits. |

Missing SLO reports for MTH 110, MTH 113, and MTH 120 are due to assigned instructors not submitting their material.

CHM 104 is delayed due to the assigned instructor having a family emergency. A revised report will be submitted once CHM 104 material is submitted.