Program Assessment

2021-2022

Engineering, Physical Science & Process Technology

Math & Physical Science - Chemistry/Physics Option	
Date	Click or tap to enter a date.
Competency # and Description	1. Use and apply physical data to solve problems
Course	CHEM 1414 – General Chemistry II PHYS 2014 – Engineering Physics I MATH 2144 – Calculus I MATH 2164 – Calculus III
Activity	CHEM 1414 – Laboratory Final PHYS 2014 - Quizzes, exams MATH 2144 – Word problems involving derivations MATH 2164 – Word problems involving vectors.
Measurement (attached copy of instrument with point distribution)	CHEM 1414 – Laboratory Final PHYS 2014 – Quizzes, exams MATH 2144 - Common questions assessed on a quiz MATH 2164 - Common questions assessed on a quiz
Evaluation Criteria	70% pass rate on exam
Fall 2021 Results	CHEM 1414 27 out of 27 – 87% PHYS 2014 19 out of 23 – 82% MATH 2144 – 26/39 (66.7%) of students met competency MATH 2164 – 12/14 (85.7%) of students met competency
Interpretation of Results for Fall 2021	
Reflection of Results for Fall 2021	
Actions for Fall 2022 Based on Results	
Timeline for Review	Fall data will be collected and reviewed in the spring and instructors from all campuses will determine needed adjustments.
Past Data and Actions	
Past Results	2015-2016 Results CHEM 1414 31 out of 44 – 70.5% PHYS 2014 14 out of 20 – 70.0% MATH 2145 not collected MATH 2155 not collected 2016-2017 Results CHEM 1414 39 out of 51 – 76.5% PHYS 2014 25 out of 25 – 100% MATH 2145 – 7/7 (100%) of students met competency MATH 2155 – 31/35 (88.57%) of students met competency

	MATH 2145 – 26/35 (74.28%) of students met competency MATH 2155 – 4/7 (57.14%) of students met competency 2017-2018 Results CHEM 1414 41 out of 53 – 77.4% PHYS 2014 19 out of 21 – 90.5% MATH 2145 9/12 (75%) of students met competency MATH 2155 6/13 (46.15%) of students met competency 2018-2019 Results CHEM 1414 26 out of 26 – 100% PHYS 2014 15 out 16 – 93% MATH 2145 – 8/16 (50%) of students met competency MATH 2155– 14/16 (87.5%) of students met competency MATH 2145 – 18/27 (66.67%) of students met competency MATH 2155 – 4/6 (66.67%) of students met competency 2019-2020 Results MATH 2145 – 17/23 (73.91%) of students met competency – both semesters combined**spring COVID-19 2020-2021 Results CHEM 1414 25 out of 31 – 80.6% PHYS 2014 15 out 21 – 71.4 %
Summary of changes	2018-2019 Changed the method of evaluation – laboratory grade and laboratory final. 2019-2020 CHEM - Adding a general chemistry I in the evening for non-traditional students. MATH – MATH – Incorporate more application problems (physics in particular) in the class lecture and homework problems. Students seem to understand concepts, but lack ability to apply those concepts. 2020-2021 CHEM - Adding a general chemistry II in the evening for non-traditional students. And will implement a Chemistry for Engineers. PHYS2014 – Incorporated more virtual learning opportunities. Added virtual and at home laboratories. 2021-2022 PHYS 2014 – Implement student resource incentive program CircleIn to promote group learning. Incorporating more general questions and oral exams. Expanding number of problems that require graphing and data analysis.
Date	Click or tap to enter a date.
Competency # and Description	2. Use logical reasoning to solve problems
Course	CHEM 1414 – General Chemistry II PHYS 2014 – Engineering Physics I MATH 2144 – Calculus I MATH 2164 – Calculus III
Activity	CHEM 1414 – Quizzes, exams PHYS 2014 - Quizzes, exams MATH 2144 – Word problems involving derivations MATH 2164 – Word problems involving vectors.

Measurement (attached copy of instrument with point distribution)	CHEM 1414 – Laboratory Final PHYS 2014 - Quizzes, exams MATH 2144 - Common questions assessed on a quiz MATH 2164 - Common questions assessed on a quiz
Evaluation Criteria	70% pass rate on exam
Fall 2021 Results	CHEM 1414 27 out of 27 – 87% PHYS 2014 19 out of 23 – 82% MATH 2144 – 26/39 (66.7%) of students met competency MATH 2164 – 12/14 (85.7%) of students met competency
Interpretation of Results for Fall 2021	
Reflection of Results for Fall 2021	
Actions for Fall 2022 Based on Results	
Timeline for Review	Fall data will be collected and reviewed in the spring and instructors from all campuses will determine needed adjustments.
Past Data and Actions	
Past Results	2015-2016 Results CHEM 1414 28 out of 45 – 62.2% PHYS 2014 14 out of 20 – 70.0% MATH 2145 103 out of 134 – 77% MATH 2155 36 out of 39 – 92% 2016-2017 Results CHEM 1414 38 out of 55 – 69.1% PHYS 2014 25 out of 25 – 100% MATH 2145 – 7/7 (100%) of students met competency MATH 2155 – 31/35 (88.57%) of students met competency MATH 2145 – 26/35 (74.28%) of students met competency MATH 2155 – 4/7 (57.14%) of students met competency 2017-2018 Results CHEM 1414 41 out of 53 – 77.4% PHYS 2014 19 out of 21 – 90.5% MATH 2145 – 9/12 (75%) of students met competency MATH 2155 – 6/13 (46.15%) of students met competency 2018-2019 Results CHEM 1414 26 out of 26 – 100% PHYS 2014 15 out 16 – 93 % MATH 2145 – 8/16 (50%) of students met competency MATH 2155 – 14/16 (87.5%) of students met competency MATH 2145 – 18/27 (66.67%) of students met competency MATH 2155 – 4/6 (66.67%) of students met competency 2019-2020 Results MATH 2145 – 17/23 (73.91%) of students met competency – both semesters combined**spring COVID-19 2020-2021 Results

	CHEM 1414 25 out of 31 – 80.6% PHYS 2014 15 out 21 – 71.4 %
Summary of changes for	2018-2019 Changed the method of evaluation – laboratory grade and laboratory final 2019-2020 CHEM/PHYS - No changes as the course is focused on developing logical reasoning. The current measures are evaluating this appropriately. MATH – not always meeting benchmark – need to emphasize more in class and see what is different from fall to spring. Continue to focus on how to analyze word problems. 2020-2021 No changes were made. 2021-2022 PHYS 2014 – Implement student resource incentive program CircleIn to promote group learning. Incorporating more general questions and oral exams. Expanding number of problems that require graphing and data analysis.
Date	Click or tap to enter a date.
Competency # and Description	3. Communicate scientific ideas through technical writing
Course	CHEM 1414 – General Chemistry II PHYS 2014 – Engineering Physics I
Activity	CHEM 1414 - Labs PHYS 2014 - Labs
Measurement (attached copy of instrument with point distribution)	CHEM 1414 - Labs PHYS 2014 - Labs
Evaluation Criteria	Pass rate of 70% on each activity
Fall 2021 Results	CHEM 1414 PHYS 2014
Interpretation of Results for Fall 2021	
Reflection of Results for Fall 2021	
Actions for Fall 2022 Based on Results	
Timeline for Review	Fall data will be collected and reviewed in the spring and instructors from all campuses will determine needed adjustments.
Past Data and Actions	
Past Results	2015-2016 Results CHEM 1414 39 out of 40 – 97.5% PHYS 2014 17 out of 20 – 85.0% 2016-2017 Results CHEM 1414 44 out of 53 – 83.0%

	PHYS 2014 26 out of 28 – 92.8% 2017-2018 Results CHEM 1414 50 out of 53 – 94.3% PHYS 2014 18 out of 21 – 85.7% 2018-2019 Results CHEM 1414 26 out of 26 – 100% PHYS 2014 12 out 17 – 70.5% 2019-2020 Results CHEM 1414 no assessment due to course delivery change. PHYS 2014 no assessment due to course delivery change. 2020-2021 Results CHEM 1414 23 out of 31 – 74.2% PHYS 2014 15 out 21 – 71.4 %
Summary of changes	2018-2019 Changed the method of evaluation – laboratory grade and laboratory final 2019-2020 As the evaluation method changed in 2018-2019, would like to continue with this to see if the trend and writing skills improve. No changes were suggested. 2020-2021 No Changes recommended. 2021-2022 PHYS 2014 – Implement student resource incentive program CircleIn to promote group learning. Incorporating more general questions and oral exams. Expanding number of problems that require graphing and data analysis.
Date	Click or tap to enter a date.
Competency # and Description	4. Solve problems related to thermodynamics
Course	CHEM 1414 – General Chemistry II
Activity	CHEM 1414 – Laboratory Final
Measurement (attached copy of instrument with point distribution)	CHEM 1414 – Laboratory Final
Evaluation Criteria	Pass rate of 70% on each activity
Fall 2021 Results	CHEM 1414 27 out of 27 – 87%
Interpretation of Results for Fall 2021	
Reflection of Results for Fall 2021	
Actions for Fall 2022 Based on Results	

Timeline for Review	Fall data will be collected and reviewed in the spring and instructors from all campuses will determine needed adjustments.
Past Data and Actions	
Past Results	2015-2016 Results CHEM 1414 34 out of 45 – 76% 2016-2017 Results CHEM 1414 46 out of 53 - 86.8% 2017-2018 Results CHEM 1414 44 out of 53 - 83.0% 2018-2019 Results CHEM 1414 26 out 26 – 100% 2019-2020 Results CHEM 1414 – no assessment due to course delivery change. 2020-2021 Results CHEM 1414 23 out 31 – 74.2%
Summary of changes	2018-2019 Changed the method of evaluation – laboratory grade and laboratory final. 2019-2020 As the evaluation method changed in 2018-2019, would like to continue with this to see if the trend continues. 2020-2021 No changes recommended. 2021-2022 No changes recommended.
	Biology/Zoo – Pre-Vet Option, Pre-Med
Date	Click or tap to enter a date.
Competency # and Description	5. Explain concepts of equilibrium, homeostasis, and energy transfer as it relates to mammalian body systems.
Course	CHEM 1414 – General Chemistry II PHYS 1114 – General Physics I PHYS 1214 – General Physics II
Activity	CHEM 1414 – Quiz, lab PHYS 1114 – Quiz, homework PHYS 1214 – Quiz, lab
Measurement (attached copy of instrument with point distribution)	CHEM 1414 – Quiz, lab PHYS 1114 – Quiz, homework PHYS 1214 – Quiz, lab
Evaluation Criteria	Pass rate of 70% on each activity
Fall 2021 Results	CHEM 1414 PHYS 1114 PHYS 1214
Interpretation of Results for Fall 2021	

Reflection of Results for Fall 2021	
Actions for Fall 2022 Based on Results	
Timeline for Review	Fall data will be collected and reviewed in the spring and instructors from all campuses will determine needed adjustments.
Past Data and Actions	
Past Results	2016-2017 Results CHEM 1414 48 out of 51 – 94.1% PHYS 1114 57 out of 62 – 91.9% PHYS 1214 32 out of 38 – 84.2% 2017-2018 Results CHEM 1414 45 out of 53 – 84.9% PHYS 1114 16 out of 19 – 84.2% PHYS 1214 12 out of 15 – 80.0% 2018-2019 Results CHEM 1414 26 out of 26 -100% PHYS 1114 38 out of 51 – 74.5% PHYS 1214 18 out of 23 – 78.3% 2019-2020 Results CHEM no assessment due to course delivery change. PHYS 1114 30 out of 40 – 75% PHYS 1214 no assessment due to course delivery change 2020-2021 Results CHEM 1414 25 out of 31 – 80.6% PHYS 1114 25 out of 42 – 59.5% PHYS 1214 7 out of 9 – 77.8%
Summary of changes for	2018-2019 No Changes 2019-2020 No Changes were suggested as this seems to meet the needs of the program. 2020-2021 No changes recommended. 2021-2022 PHYS 2014 – Implement student resource incentive program CircleIn to promote group learning. Incorporating more general questions and oral exams. Expanding number of problems that require graphing and data analysis.
	Biology/Zoo – Pre-Vet Option
Date	Click or tap to enter a date.
Competency # and Description	6. Demonstrate effective oral and written expression.
Course	CHEM 1414 – General Chemistry II
Activity	CHEM 1414 – Lab
Measurement (attached copy of instrument with point distribution)	CHEM 1414 –Lab

Evaluation Criteria	70% pass rate on activity
Fall 2021 Results	CHEM 1414
Interpretation of Results for Fall 2021	
Reflection of Results for Fall 2021	
Actions for Fall 2022 Based on Results	
Timeline for Review	Fall data will be collected and reviewed in the spring and instructors from all campuses will determine needed adjustments.
Past Data and Actions	
Past Results	2017-2018 Results CHEM 1414 14/18 – 77.8% 2018-2019 Results CHEM 1414 26/26 – 100% 2019-2020 Results CHEM 1414 no assessment due to course delivery change 2020-2021 Results CHEM 1414 25 out of 31 – 80.6%
Summary of changes	2018-2019 Changed the method of evaluation – laboratory grade and laboratory final 2019-2020 As the evaluation method changed in 2018-2019, would like to continue with this to see if the trend continues. 2020-2021 No changes recommended. 2021-2022 No changes recommended.
	Biology/Zoo – Pre-Med Option
Date	Click or tap to enter a date.
Competency # and Description	7. Demonstrate effective implementation of the scientific method and written and oral expression of scientific concepts and analysis of data.
Course	CHEM 1414 – General Chemistry II PHYS 1114 – General Physics I PHYS 1214 – General Physics II
Activity	CHEM 1414 - lab PHYS 1114 – Quiz, lab PHYS 1214 – Quiz and lab
Measurement (attached copy of instrument with point distribution)	CHEM 1414 - lab PHYS 1114 – Quiz, lab PHYS 1214 – Quiz and lab

Evaluation Criteria	70% pass rate on activity
Fall 2021 Results	CHEM 1414 PHYS 1114 PHYS 1214
Interpretation of Results for Fall 2021	
Reflection of Results for Fall 2021	
Actions for Fall 2022 Based on Results	
Timeline for Review	Fall data will be collected and reviewed in the spring and instructors from all campuses will determine needed adjustments.
Past Data and Actions	
Past Data	2015-2016 Results CHEM 1414 46 out of 46 – 100% PHYS 1114 63 out of 72 – 87.5% PHYS 1214 21 out of 23 – 91.3% 2016-2017 Results CHEM 1414 46 out of 55 – 83.6% PHYS 1114 57 out of 63 – 90.5% PHYS 1214 27 out of 31 – 97.1% 2017-2018 Results CHEM 1414 50 out of 53 – 94.3% PHYS 1114 25 out of 28 – 89.3% PHYS 1214 15 out of 15 – 100.0% 2018-2019 Results CHEM 1414 26 out of 26 – 100.0% PHYS 1114 38 out of 51 – 74.5% PHYS 1214 18 out of 23 – 78.3% 2019-2020 Results CHEM 1414 not assessed due to change in delivery method. PHYS 1114 30 out of 40 – 75% PHYS 1214 not assessed due to change in delivery method. 2020-2021 Results CHEM 1414 23 out of 31 74.2% PHYS 1114 38 out of 40 – 95% PHYS 1214 8 out of 9 – 88.9%
Summary of changes	2018-2019 Changed the method of evaluation – laboratory grade and laboratory final. 2019-2020 As the evaluation method changed in 2018-2019, would like to continue with this to see if the trend continues. 2020-2021 No changes recommended. 2021-2022 No changes recommended.

Date	Click or tap to enter a date.
Competency # and Description	8. Demonstrate the concepts of equilibrium and energy transfer.
Course	CHEM 1414 – General Chemistry II PHYS 1114 – General Physics I
Activity	PHYS 1114 – Quiz, exam
Measurement (attached copy of instrument with point distribution)	CHEM 1414 – Laboratory Final PHYS 1114 – Quiz, exam
Evaluation Criteria	70% pass rate on activity
Fall 2021 Results	CHEM 1414 PHYS 1114
Interpretation of Results for Fall 2021	
Reflection of Results for Fall 2021	
Actions for Fall 2022 Based on Results	
Timeline for Review	Fall data will be collected and reviewed in the spring and instructors from all campuses will determine needed adjustments.
Past Data and Actions	
Past Results	2015-2016 Results CHEM 1414 32 out of 45 – 66.7% PHYS 1114 54 out of 66 – 81.8% 2016-2017 Results CHEM 1414 46 out of 53 - 86.8% PHYS 1114 57 out of 63 – 90.5% 2017-2018 Results CHEM 1414 43 out of 53 – 81.1% PHYS 1114 16 out of 19 – 84.2% 2018-2019 Results CHEM 1414 26 out of 26 – 100% PHYS 1114 38 out of 51 – 74.5% 2019-2020 Results CHEM 1414 not assessed due to change in delivery method. PHYS 1114 30 out of 40 – 75% 2020-2021 Results CHEM 1414 23 out of 31 – 74.2% PHYS 1114 25 out of 42 – 59.5%
Summary of changes	2018-2019 Changed the method of evaluation – laboratory grade and laboratory final. 2019-2020 As the evaluation method changed in 2018-2019, would like to continue with this to see if the trend continues.

	2020-2021 No changes recommended. 2021-2022 Saw a decline but believe it was due to changes in delivery method. No change would like to see if trend continues.

Summary of Program and Divisional Changes	
2016-2017	• Modified semester offerings of CHEM 1014 Concepts of Chemistry to address the needs of multiple degree program. • Added summer offerings of CHEM 1314 (Tonkawa). • Added online offerings of PHSC 1114 General Physical Science to both Spring and Summer schedules. • Added online sections of ESCI 1114 Earth Science to Summer schedule.
2017-2018	• Added a grading rubric to streamline assessment data collection. • Added online sections of CHEM 1014 Concepts of Chemistry to Summer schedule.
2018-2019	No changes suggested due to recent changes to see if trends continue from prior years
2019-2020	No changes suggested.
2020-2021	PHYS– Implement student resource incentive program CircleIn to promote group learning. Incorporating more general questions and oral exams. Expanding number of problems that require graphing and data analysis.
2021-2022	

Recommendations for Program Changes	
2017-2018	• Pursue more online and evening offerings of course for non-traditional students. • Design program options for different workforce areas. • Assess the needs of adding course offerings in the subjects areas of circuits, concepts of physics (online) and a General, Organic, Biochemistry (GOB) course.
2018-2019	• Add an evening CHEM 1314 General Chemistry I to the Tonkawa course offerings. • Propose splitting the division to form a stand alone Division of Physical Science and Engineering due to growth of programs within the current division. • Incorporating an "Introduction to Scientific Research Course" into the program
2019-2020	• Added the evening CHEM 1314 and an online Gen Chem 1. • Continue to evaluate the current assessment tools. • Working with Math on the Calculus sequencing.
2020-2021	• Changed delivery method due to COVID
2021-2022	• Implement more virtual laboratory experiences in the physics program to be used with the lecture and the laboratory. • Incorporate more asynchronous materials to support the course work. • Incorporate a peer-to-peer learning tool.

2022-2023	•

Ag, Science, & Engineering

		Program Level Outcomes Timeline				
Program Objectives – Chemistry/Physics	Course Map	2015-2016	2016-2017	2017-2018	2018-2019	2019-2020
1. Use and apply physical data to solve problems	CHEM 1414 PHYS 2014 MATH 2144 MATH 2164	X	X	X	X	X
2. Use logical reasoning to solve problems	CHEM 1414 PHYS 2014 MATH 2144 MATH 2164	X	X	X	X	X
3. Communicate scientific ideas through technical writing	CHEM 1414 PHYS 2014	X	X	X	X	X
4. Solve problems related to thermodynamics	CHEM 1414	X	X	X	X	X
Explain concepts of equilibrium, homeostasis, and energy transfer as it relates to mammalian body systems.	CHEM 1414 PHYS 1114 PHYS 1214	X	X	X	X	X
Demonstrate effective oral and written expression.	CHEM 1414	X	X	X	X	X
Demonstrate effective implementation of the scientific method and written and oral expression of scientific concepts and analysis of data.	CHEM 1414 PHYS 1114 PHYS 1214	X	X	X	X	X
Demonstrate the concepts of equilibrium and energy transfer.	CHEM 1414 PHYS 1114	X	X	X	X	X