Barstow Community College

INSTRUCTIONAL PROGRAM REVIEW

(Refer to the Program Review Handbook when completing this form)

PROGRAM:	Natural Science and Mathematics A.S. – Chemistry			
Academic Year:	2015-16	**FULL PROGRAM REVIEW**	**Date Submitted:**	Oct 19, 2015
Academic Year:		**ANNUAL UPDATE #1**	**Date Submitted:**	
Academic Year:		**ANNUAL UPDATE #2**	**Date Submitted:**	

By:

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1. Program Mission and Vision

A. Program Mission

The mission of the Department of Chemistry is to provide students with an environment that encourages them to examine the physical universe, to spur an intellectual curiosity based on the development of an understanding and appreciation of the scientific method that will lead to the ability to apply logical, quantitative, and qualitative reasoning in scientific problem solving and analyzing scientific arguments, a skill which has great use in and beyond the classroom.

B. Program Vision *(Where would you like the Program to be three years from now?)*

The Department of Chemistry strives to achieve and maintain excellence in student learning and success.

C. Describe how mission and vision align with and contribute to the College's Mission and Vision

"Barstow Community College is an accredited, open access institution of higher learning committed to providing our students, community, and military population with the educational tools to achieve personal goals and professional growth." The Department of Chemistry develops the reasoning and problem solving abilities of our students, a mission which aligns with the mission of Barstow Community College by giving the students valuable tools to use to achieve their goals, tools that they will carry with them beyond the classroom, into their lives and careers. Chemistry offers a unique classroom experience, as do many sciences, due to the incorporation of a laboratory component. The different learning atmospheres in the classroom and the lab offer the opportunity to explore different learning styles, as well as the opportunity for the students to communicate and work with each other and with the professors toward common goals

"Empowering Students to Achieve Their Personal Best Through Excellence in Education." By maintaining a standard of excellence in student learning and success, the vision of the Department of Chemistry clearly aligns with the vision of Barstow Community College.

2. Program Description and Overview

Assume the reader does not know anything about the Program. Describe the Program, including—but not limited to—the following:

A. Organization, including staffing and structure

The Department of Chemistry currently consists of one full-time instructor and one part-time instructor. The only course currently offered is Chem 1: Introductory Chemistry. The class consists of two and a half hours of lecture and two hours and fifty minutes of lab each week.

B. Who do you service (including demographics)?

This course is designed for students, whose career goals lie in the allied health fields, especially nursing. The students are very diverse in age, ethnicity, socioeconomic status, and in educational background.

C. What kind of services does your unit provide?

The class is offered on the BCC campus both day and night to accommodate student's schedules. It is a pre-requisite for other classes, such as microbiology, that are requirements for allied health students

D. How do you provide them?

All sections of the class are traditional classes. The possibility of hybrid classes will be explored once the enrolment in the traditional classes grows sufficiently.

E. Does the program have a degree or certificate?

There is no Chemistry degree nor certificate available at BCC yet.

3. Program Data

A. PERFORMANCE DATA

Discuss the program's performance on the specific data items listed below:

1) Full-time/Part-Time Faculty Ratio

1:1

	TRADITIONAL	ONLINE
2) Course Completion Rate	82%	0%
3) Course Success/Retention Rate	66%	0%
4) WSCH/FTEF Ratio		
Full-time:	251.4	0
Part-time:	300.0	0
5) Fill Rate	88%	0%

Reflect on the data above:

An 82% course completion rate for Introductory Chemistry is a reasonable number for such a class of this particular subject matter, but a 66% success/retention rate is low. The fill rate for a class that is necessary as a prerequisite for core pre-nursing courses should be significantly higher than 88%.

B. PROGRESS ON PROGRAM LEVEL OUTCOMES (PLOS) AND STUDENT LEARNING OUTCOMES (SLOS)

1) List your Program Level Outcomes (PLOs).

1. Demonstrate knowledge of natural phenomena and recognize the processes that explain them.
2. Demonstrate knowledge of scientific methodologies when solving a problem.
3. Apply formal systems of reasoning, critical thinking, and mathematical methods in solving or analyzing problems.

2) Summarize the progress you have made on Program Level Outcomes.

Program level outcomes continue to be examined, and student learning outcomes are assessed each semester for each class.

3) Summarize the progress made on course-level outcomes and assessments; use specific data, if possible.

No data.

4) Describe any program, course, and/or instructional changes made by your program as a result of the outcomes assessment process.

No major changes have been made. The students continue to be encouraged to visit the tutoring center for assistance.

5) Reflecting on the responses for #2 and #3 above, what will you implement for the next assessment cycle?

For the next assessment cycle, a new set of SLOs will be submitted to committee for approval that are more current and aligned with the new direction that Introductory Chemistry is taking.

C. SUPPORTING ASSESSMENT DATA *(See Handbook for additional information)*

1) Provide a list of any additional measures *(not included in 3.A.)* that you have chosen to gauge your program's effectiveness *(e.g.: transfers, degrees, certificates, satisfaction, student contacts, student headcount, Perkin's data, etc.).*

The most appropriate measure of success at this point in the Department of Chemistry will be to monitor enrolment in the Introductory Chemistry course. Once the course is accepted for transfer into nursing programs, the number of students that transfer to these programs could potentially also be used as a measure of success.

1a) If this is a CTE program ending with a certificate or degree, include data on employment opportunities, compliance with advisory recommendations, and fiscal viability of program. *(Include labor market and demand information using resources in CTE and the PR Handbook.)*

N/A

2) Summarize the results of the measures listed in #1 above:

There are no results to discuss at this point. Enrolment trends will need to be examined over the next few semesters and will be discussed in the annual updates.

3) What did you learn from your evaluation of these measures, and what improvements have you implemented, or do you *plan** to implement, as a result of your analysis of these measures? *(*List any resources required for planned implementation in #10: Resources.)*

Chemistry at BCC has historically been a class that students avoid. By monitoring the growth of student enrolment, it will potentially be shown that the class is successful in producing well-prepared students. With a larger student population in the program, data from student assessment will be more accurate and meaningful.

D. TWO YEAR SCHEDULING PLAN

1) What is the program's Two-Year Scheduling Plan?

Currently the only course offered by the Department of Chemistry is Chem 1: Introductory Chemisrty. Multiple sections of this course are offered each semester.

2) What changes, if any, have been made since the last Program Review?

No changes have been made to the chemistry course offerings since the last program review.

3) How effective has the Two-Year Scheduling Plan been in meeting student needs and educational goals? If this is a degree or certificate pathway, can students complete in two years?

The plan has been effective in meeting student needs since Chem 1 is a course needed to achieve student goals and it is available each semester.

4) Reflecting on the responses above, what are the goals for the next program review cycle?

Additional chemistry courses will need to be offered starting with a General Chemistry course. The demand for this will be examined. The demand for a hybrid Introductory Chemistry course will also be examined.

4. Curriculum

A. List any new courses or program changes since the last program review. Be sure to include if any new courses have approved prerequisites or corequisites.

No new courses have been added to the chemistry program.

B. Verify currency of curriculum: Other than above, what changes have been made in the curriculum since the last full program review? (*Updates, delivery mode changes, archives, deletions, revisions, etc.)*

No changes have been made in the curriculum of the Chem 1 course.

1) CURRICULUM CURRENCY: Verify that all Transfer Level Courses are current and aligned for transfer. *(May require reviewing ASSIST or meeting with Articulation Officer.)*

Chem 1 is transferable as a general education course at the CSU level, and is a course that is accepted as an IGETC requirement.

2) CURRICULUM DEVELOPMENT: Verify that all textbooks on Course Outlines of Record (COR) are up to date. Normally, textbook editions should be within five years for articulation. *(Contact Articulation Officer for additional information.)*

The textbook that is listed on the COR is the book currently used in the Chem 1 course and it has a copyright date of 2007. A more current book is in the process of being adopted for this course.

C. List any courses not in full compliance with appropriate guidelines, including ASSIST, C-ID, Curriculum Committee, prerequisite validation, etc. *(NOTE: Any courses that have not been updated in the past six years may not be in compliance. See Curriculum Manual or Articulation Officer for additional information, if necessary.)*

The course is in compliance.

D. Curriculum Development: What is the plan for maintaining the currency and viability of your curriculum *(including all modes of delivery)*?

The COR for Chem 1 is currently being examined to remedy the issues that caused the course not to transfer to certain nursing programs. The implementation of a new textbook with chapters covering both organic chemistry and biochemistry is imperative to this goal. Chem 1 will continue to be delivered as a traditional class and a hybrid option will be examined when the time is appropriate.

5. Internal Factors *(see Handbook for additional information)*

A. Strengths: *Current aspects of the program or department that serve it and its future well. These aspects include what it does well, what it's known for, what it takes pride in, and so forth. Strengths represent competencies or characteristics that the department or program may wish to enhance or preserve actively, even aggressively.*

One strength of the Chemistry department is the holistic approach that it provides with the other science departments at the college. The science professors share many of the same students in a given semester, and can work together to ensure the students' successes in their chosen program. This instills a perception of a unified team within the whole science department, and it instills an understanding that the classes that the students take do not stand on their own, but are part of a bigger picture where all sciences are tied together. Another strength of the department is the recent hire of a full-time faculty member committed to improving and growing the department.

B. Weaknesses: *The program or department's **internal** vulnerabilities. These are areas that, if not addressed, could become liabilities, or could contribute to an erosion of the department's capacities and future growth. They represent areas where the organization needs to improve if it is to be successful for the long term.*

One of the largest weaknesses of the Chemistry Department is the fact that the only class offered currently does not transfer to the closest nursing programs. Students at BCC have to take Chem 1 in order to fulfill prerequisites for other pre-nursing courses, but then have to take Introductory Chemistry again elsewhere so that the units transfer. This issue causes students to take the class at a college where it is transferable which in turn causes the class enrolment at BCC to be significantly lower than it should. The students that do take Chem 1 at BCC are frustrated at its lack of transferability into their desired programs. Another weakness is that there are no chemistry classes offered for majors. This deters any student interested in the physical sciences from coming to BCC for their continuing education. In addition, certain instruments that are currently used in experiments for the course are extremely out-dated and do not give the students any experience working with instruments that are actually used outside of BCC. The department has very few spectrometers and some are broken so there are not enough spectrometers for the students to use in lab. As stated above, the textbook hasn't been updated in years, and its last copyright was in 2007. A new text book needs to be adopted for this course that is a more up-to-date book. While the content changes little in chemistry at this level, the applicability does and a book that discusses current trends in science and everyday life is imperative. No Supplemental Instruction exists for the chemistry program and currently there is little to no interaction between the tutors and the chemistry

faculty. The availability of supplemental instruction has been shown to increase student course success for the courses that offer SI, and studies have also shown a correlation between hours spent in tutoring, both one-to-one and in tutor run workshops, and course grades/success. Chemistry is an inherently difficult subject, which lies at the core of the majority of the other science classes that students take, indicating that an understanding of chemistry is not necessary only for chemistry, but also for biology, biochemistry, and microbiology at a minimum.

6. External Factors *(see Handbook for additional information)*

A. Opportunities: *Current trends and events occurring **outside** the department that, if taken advantage of, are likely to have a positive effect on its long-term success. Examples may include: realistic training opportunities; industry trends; revenue-generation opportunities; development of new tools or technology to help manage workload.*

The majority of the students that take Chem 1 are allied health students with the goal of becoming nurses. With the current trend in health care, nurses continue to be in high demand. This gives the department the opportunity to serve a steady flow of students, the numbers of which will grow as word spreads about the current changes happening in the department. The growth will benefit the Chemistry department as well as other related departments, and it will give the Chemistry department the opportunity to enhance the collaborative efforts between the different science departments. As most of the faculty in the sciences teach the same cohorts of students, the professors have the ability to work together to make class content inclusive of the different disciplines, to enforce the emerging culture of the sciences not being individualized, but rather very intertwined. The professors also have the ability to work together to keep their shared students on the right path in their educational journey.

B. Threats: *Current trends and events occurring **outside** the department or program that could jeopardize its success represent potential threats. Examples may include: state, regional, or institutional economic/budget climate; loss of support services; seasonal fluctuations in workload.*

The change in requirements of the local nursing programs continues to be a threat, as stated above, due to the fact that Introductory Chemistry is no longer accepted for transfer to these institutions.

7. Continuing Education/Professional Development

A. What continuing education and/or professional development activities have program/unit members attended during the current cycle?

The full-time chemistry instructor has attended many workshops and conferences in the last year, including STEM Tech 2014 in Denver, CO, BSILI 2015 in Lake Arrowhead, CA, and a Reading Apprenticeship (RA) in STEM conference in Oakland, CA. An online RA course that was completed in the Spring of 2015, preceeded the RA conference. The same instructor is scheduled to attend STEM Tech 2015 in Phoenix, AZ.

B. How did this benefit your department and the College?

The focus of STEM Tech is for faculty, counselors and administrators to come together for workshops and discussions in innovative ways of teaching STEM courses, as well as strategies for recruiting, retaining and transferring students in STEM fields. Many of the workshops focus on how faculty can increase the success of underrepresented students in STEM fields. This benefits the instructors by providing ideas on

how to motivate students from such diverse backgrounds, which in turn benefits the students by increasing their chances of completing their classes with better understanding and higher grades, which in turn benefits the college due to more students completing degrees or certificate programs and/or transferring to four-year institutions. The reading Apprenticeship program is based on the philosophy that students must become confident and active readers in order to be successful in school. Science text is particularly difficult to digest, and the workshops teach different methods to use with students to assist them in becoming more successful in understanding science text. This is beneficial to the college by training students to become active in their reading which is useful in all of their classes and helps with their success.

C. What are the plans for continuing education and/or professional development in the upcoming cycle?

The full time instructor is scheduled to attend STEM Tech 2015 in November 2015, and would like to make this conference an annual occurrence.

8. Prior Goals/Objectives

- Briefly summarize the progress your program has made in meeting the goals and objectives identified in the most recent Program Review or Annual Update. *(Include measurements of progress or assessment methods.)*
- If the program does not have prior goals and objectives, please explain.

The Department of Chemistry doesn't have prior goals and objectives specific to the department since this is the first program review written for the Chemistry Department alone. The previous goals for the Department of Natural Science and Math were to provide students a successful college learning experience and to foster and improve offerings in regard to innovative learning environment that respects diversity. The Department of Chemistry continues to provide students a successful college learning experience by providing quality instruction that emphasizes the relevance of chemistry in our lives, specifically in the health fields, as most of the students in the chemistry course offered are planning on pursuing careers in the allied health fields. Offerings have not been improved in the Department of Chemistry, as only the single class, Introductory Chemistry is currently offered. This remains a goal. The Department of Chemistry remains committed to fostering innovative learning environments that respect diversity through using active teaching in both the classroom and laboratory settings, which has been proven to increase understanding, engagement, and success.

9. Goals/Objectives/Actions (ACTION PLAN)

A. GOALS: Formulate Program Goals to maintain or enhance program strengths, or to address identified weaknesses.

B. ALIGNMENT: Indicate how each Goal is aligned with the College's Strategic Priorities.

C. OBJECTIVES: Define Objectives for reaching each Goal.

D. ACTIONS/TASKS REQUIRED TO ACHIEVE OBJECTIVE: Create a coherent set of specific steps (Actions/Tasks) that must be taken to achieve each Objective.

E. OUTCOMES: State intended Outcomes and list appropriate measures and assessment methods for each Outcome.

F. ADDITIONAL INFORMATION: This area provides for the additional communication of information necessary to further "close the loop" on the goal or action plan, as it relates to Institutional Planning. This may include references to other institutional documents, such as governing or compliance documents (i.e. Board Policy, Administrative Procedures, Title V), institutional planning documents (i.e. Strategic Plan, Educational Master Plan, Facilities Plan, Technology Plan), or Board, Presidential, Supervisory or Departmental recommendations or goals, etc. *(See Handbook for additional examples.)*

Complete the following table with your Program's **ACTION PLAN**, which must include a **minimum of 3 goals**:

ACTION PLAN						
GOAL		ALIGNMENT WITH BCC STRATEGIC PRIORITIES	OBJECTIVE		ACTIONS/TASKS REQUIRED TO ACHIEVE OBJECTIVE	OUTCOMES, MEASURES, and ASSESSMENT
#1	Foster an innovative learning environment in the classroom and laboratory.	*Priority #1*	#1	To offer programs and services for students outside the classroom	Work closely with the tutoring center and examine the possibility of introducing an SI component to the class	Students will have more resources outside of the classroom. The success will be measurable by an increase in the percentage of students that succeed and/or remain enrolled in the course.
			#2			
			#3			
	Additional Information:					
#2	Provide a successful college learning experience.	*Priority #2*	#1	To make current courses more widely transferable	Work with counselors at BCC and at other institutions to construct an acceptable COR for Introductory Chemistry	Chem 1 will be transferable and more students will be willing to take it at BCC. The success will be measurable by an increase in enrolment in the Chem 1 class as well as the number of students that transfer.
			#2	To offer a wider variety of chemistry classes	Research the demand for additional classes and create or unarchive additional chemistry classes.	Additional chemistry classes will be offered for students that are interested in focusing on hard sciences or STEM fields. The success will be measurable by the implementation of new courses by the college.
			#3			

ACTION PLAN						
GOAL		ALIGNMENT WITH BCC STRATEGIC PRIORITIES	OBJECTIVE		ACTIONS/TASKS REQUIRED TO ACHIEVE OBJECTIVE	OUTCOMES, MEASURES, and ASSESSMENT
	Additional Information:					
#3	Promote and support student engagement.	*Priority #3*	#1	To maintain currency in teaching techniques and pedagogy	Attend workshops and conferences that focus on teaching techniques and pedagogy in the STEM fields.	Instructors will be current with the techniques and pedagogy used in teaching STEM classes. The success could be measured by maintaining sufficient retention and success rates.
			#2			
			#3			
	Additional Information:					

10. Resources Required

List all significant resources needed to achieve the objectives shown in the table above, including personnel, training, technology, information, equipment, supplies, and space. Every request for additional resources must support at least one objective.

Also list any resources required to implement planned improvements noted in 3.C.3)

IMPORTANT: A BUDGET ALLOCATION PROPOSAL must be completed and submitted for EACH new resource requested.

Goal #	Objective #	Resource Required	Estimated Cost	BAP Required? Yes or No	If No, indicate funding source

Annual Update #1 Academic Year:

1. Progress on Program Level Outcomes (PLOs) and Student Learning Outcomes (SLOs) **(from #3B of full PR)**

A) List your Program Level Outcomes:

B) Summarize the progress you have made on Program Level Outcomes (PLOs):

C) Summarize the progress you have made on course level outcomes and assessments (SLOs):

D) Describe any program, course, and/or instructional changes made by your program as a result of the outcomes assessment process.

E) Reflecting on the responses for B) and C) above, what will you implement for the next assessment cycle?

2. GOALS AND OBJECTIVES (Taken From #9--Action Plan--of FULL Program Review)

GOAL		OBJECTIVE		ACTIONS/TASKS REQUIRED TO ACHIEVE OBJECTIVE	OUTCOMES, MEASURES, and ASSESSMENT
#1		#1			
		#2			
		#3			

Goal #1 Annual Update: (Assess progress made toward goal attainment)

GOAL		OBJECTIVE		ACTIONS/TASKS REQUIRED TO ACHIEVE OBJECTIVE	OUTCOMES, MEASURES, and ASSESSMENT
#2		#1			
		#2			
		#3			

Goal #2 Annual Update: (Assess progress made toward goal attainment)

GOAL		OBJECTIVE		ACTIONS/TASKS REQUIRED TO ACHIEVE OBJECTIVE	OUTCOMES, MEASURES, and ASSESSMENT
#3		#1			
		#2			
		#3			

Goal #3 Annual Update: (Assess progress made toward goal attainment)

3. Resources Required

List all significant resources needed to achieve the objectives shown in your action plan, including personnel, training, technology, information, equipment, supplies, and space. Every request for additional resources must support at least one objective.

Also list any resources required to implement planned improvements noted in 3.C.3)

IMPORTANT: A BUDGET ALLOCATION PROPOSAL must be completed and submitted for EACH new resource requested.

Goal #	Objective #	Resource Required	Estimated Cost	BAP Required? Yes or No	If No, indicate funding source

Annual Update #2	Academic Year:

1. Progress on Program Level Outcomes (PLOs) and Student Learning Outcomes (SLOs) **(from #3B of full PR)**

A) List your Program Level Outcomes:

B) Summarize the progress you have made on Program Level Outcomes (PLOs):

C) Summarize the progress you have made on course level outcomes and assessments (SLOs):

D) Describe any program, course, and/or instructional changes made by your program as a result of the outcomes assessment process.

E) Reflecting on the responses for B) and C) above, what will you implement for the next assessment cycle?

2. GOALS AND OBJECTIVES (Taken From #9--Action Plan--of FULL Program Review)

GOAL		OBJECTIVE		ACTIONS/TASKS REQUIRED TO ACHIEVE OBJECTIVE	OUTCOMES, MEASURES, and ASSESSMENT
#1		#1			
		#2			
		#3			

Goal #1 Annual Update: (Assess progress made toward goal attainment)

GOAL		OBJECTIVE		ACTIONS/TASKS REQUIRED TO ACHIEVE OBJECTIVE	OUTCOMES, MEASURES, and ASSESSMENT
#2		#1			
		#2			
		#3			

Goal #2 Annual Update: (Assess progress made toward goal attainment)

GOAL		OBJECTIVE		ACTIONS/TASKS REQUIRED TO ACHIEVE OBJECTIVE	OUTCOMES, MEASURES, and ASSESSMENT
#3		#1			
		#2			
		#3			

Goal #3 Annual Update: (Assess progress made toward goal attainment)

3. Resources Required

List all significant resources needed to achieve the objectives shown in your action plan, including personnel, training, technology, information, equipment, supplies, and space. Every request for additional resources must support at least one objective.

Also list any resources required to implement planned improvements noted in 3.C.3)

IMPORTANT: A BUDGET ALLOCATION PROPOSAL must be completed and submitted for EACH new resource requested.

Goal #	Objective #	Resource Required	Estimated Cost	BAP Required? Yes or No	If No, indicate funding source