

# INSTRUCTIONAL Program Review Annual Update

Department:	EARTH SCIENCE PROGRAM	Drafted and Submitted by Scott Bulkley	
Academic Year:	2016-2017	Annual Update # 1	<input checked="" type="checkbox"/> Annual Update #2 <input type="checkbox"/>

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

### A) List your Program Level Outcomes:

Numbers Indicate the Relationship of Program Learning Outcomes (PLOs) to the Outcomes Assessment:  
Core Competencies

1. Communication
2. Critical Thinking
3. Global Consciousness (Awareness)
4. Personal Development and Responsibility

**PLO #1.** Students will be able to demonstrate orally, and in written form, an understanding of the processes of earth science, the scientific method, and the relationship between scientific research and established knowledge. This includes the ability to

1. Recognize the way in which research leads to generally accepted conclusions and the integration of new research data with the building of a body of scientific knowledge, and/or (1,3,4)
2. Design a scientific inquiry, including use of proper controls and analyses, and/or (2)
3. Demonstrate critical thinking skills shown by the analysis of data sets and the synthesis of information to draw conclusions, and/or (2,3)
4. Produce an essay explaining scientific processes in clear and concise terms, and/or (1)
5. Produce laboratory reports which address background information, procedures, results, and analysis of data during a lab exercise or inquiry project. (1,2)

**PLO #2.** Students will be able to demonstrate both content knowledge in earth science and test taking skills when completing essay and objective exams. This includes the ability to

1. Demonstrate problem solving abilities in the major content areas of science, and/or (1,2)
2. Analyze the logic of objective questions and choosing the correct answers, and/or (1,2)
3. Writing clear concise responses to essay questions. (1,2,4)

**PLO #3.** Evaluate scientific data, draw reasonable conclusions, recognize the ethical implications of these conclusions, and apply these conclusions to personal, community, or scientific problems. This includes the ability to

1. Choose what data to collect in order to address a specific hypothesis, and/or (2,3)
2. Collect data and keep organized records, and/or (2)

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3. Ability to reach and clearly express logical conclusions based on scientific data, and/or (1,2,3)
4. Relate how scientific information is relevant to personal and community issues, and/or (4)
5. Recognize the ethical implications of scientific research and the responsibility to use knowledge wisely. (4)

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

The Program has begun the assessment process for its Program Level Outcomes (PLOs). Program Level Outcomes are being measured in three different ways.

- 1) Success Data from each Course and Department
- 2) Retention Data from each Course and Department
- 3) Student Surveys in each Course for a Direct Measurement

The data is currently being aggregated and program norms are being established.

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

Over the last Academic year, all course-level SLOs were measured and assessed each semester for each class offered in the Program. The Assessments for the 2015-2016 academic year based upon measurement of Course-Level Student Learning Outcomes are as follows:

	<u>Fall 2015</u>	<u>Spring 2016</u>
ASTR 1:		
SLO #1: Student Success Rate =	67%	64%
SLO #2: Student Success Rate =	67%	64%
SLO #3: Student Success Rate =	84%	86%
ASTR 1L:		
SLO #1: Student Success Rate =	72%	70%
SLO #2: Student Success Rate =	83%	85%
SLO #3: Student Success Rate =	85%	87%
OCEA 1:		
SLO #1: Student Success Rate =	Not Offered	68%

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SLO #2: Student Success Rate =	Not Offered	68%
SLO #3: Student Success Rate =	Not Offered	86%
PHSC 2:		
SLO #1: Student Success Rate =	65%	69%
SLO #2: Student Success Rate =	65%	69%
SLO #3: Student Success Rate =	85%	82%

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

Based upon the process of outcomes assessment, the following changes were made during the 2015-2016 Academic Year:

- a) Student tutors for ALL courses were recommended to Tutorial Services in order to assist students.
- b) ALL exams in ALL courses were reviewed to make sure that problematic questions were analyzed and changes were made to improve those questions and/or areas of instruction before the next time that the course is taught.
- c) More one-on-one communication opportunities between the instructor and individual students in preparation for the exams was added to the ASTR 1, PHSC 2, and OCEA 1 courses.
- d) Outlines for Research Projects in ALL courses taught were assigned to the students and submitted to the instructor by the halfway point in the semester so that direct feedback could be given.
- e) In the PHSC 2 and OCEA 1 courses, one-on-one class time was provided between the instructor and the Research Project groups for consultation, assistance, and to help guide the students and/or answer any questions. Groups were also required to present a weekly oral update on their progress with this project to the instructor. A Grading Rubric, created from the assignment Checklist, was implemented for the Research Project.
- f) Students in ALL Courses were required to submit a more comprehensive Outline on their Oral Presentation in advance and provide references (and citations) as well. One-on-one time between the instructor and each student was provided to guide/help the student on the Oral Presentation Project and/or answer any questions. A Grading Rubric was created and implemented for the Oral Presentation Assignment.

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- g) Library Exercises and Tutorials are now a part of ALL of the courses taught in every department.
- h) New Computer Activities for ALL courses were added and enhanced due to the upgrade of all of the computers and software programs in the Earth Science Laboratory Classroom.

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

The following items will be implemented for the next assessment cycle:

#### **ALL CLASSES:**

- 1) ALL exams in ALL courses will continue to be reviewed to make sure that problematic questions are analyzed and changes are made to improve those questions and/or areas of instruction before the next time that the course is taught.
- 2) A longer and more comprehensive In-Class Review Session will be conducted before each of the exams in the ASTR 1, PHSC 2, and OCEA 1 courses.
- 3) Once again, every effort will be made to identify a Student Tutor who will be recommended to Tutorial Services in order to assist students with each course. If a Student Tutor cannot be located and approved by Tutorial Services in order to assist students with ANY of the courses, the instructor will offer to individually tutor students either on a one-to-one basis or in groups during his office hours.

#### **PHSC 2 and OCEA 1:**

- 1) Students will be required to use at least three resources from our on-campus Academic Library, in addition to Internet Resources, in order to gain more experience in locating and using Library materials.
- 2) Examples of Project Visual Aids from students in prior classes will also be shown to current students so that they can have a better idea of how to successfully complete this aspect of the Research Project.
- 3) The Grading Rubric developed last year was very successful and will continue to be utilized in future semesters for the course.

#### **PHSC 2 ONLY:**

- 1) The Research Project Assignment will be distributed at an earlier part of the semester in order to afford students greater time to research and complete the assignment.
- 2) Students will be required to finish their poster visual aid at least a full week before they present it to the class to allow more time and energy to be devoted to their oral speeches.
- 3) Students will now also play an important role in assessing the work of other project groups in the class, as well as completing a "Self-Evaluation" Form addressing the level of their own individual contributions on the assignment. The Overall Project Evaluation Form will zero in on the following three questions:
  - a) What were the best parts of each Project? And Why?
  - b) What did they learn from each Project?
  - c) How could each Project have been Improved?

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### **ASTR 1 and ASTR 1L:**

1) Additional Hands-On time between the instructor and each student will be provided at the Astronomical Observatory to guide/help each student on the Sky Journal Research Project and answer any questions.

2) For the Sky Journal Research Project, examples of excellent work from students in prior classes will be shown to current students so that they can have a better idea of how to successfully complete the project.

3) Students will be provided with added resources for identifying celestial objects with respect to the Sky Journal Project. Additional maps for locating constellations and specific visible stars within them will be available. Handouts will also be distributed for finding planets and observing meteor showers.

### **ASTR 1L ONLY:**

1) Based upon the data collected and analysis, the objectives and procedures for one Lab will be changed, and another Lab will be completed deleted with an alternative substituted for next semester.

2) Labs where the student average score is less than 70% will continue to be reviewed, and further changes may be implemented.

3) Students will be afforded additional time to complete their Lab Reports including, in some cases, the possibility of finalizing and submitting them the following week.

4) Students will now be required to create and utilize a Visual Aid in order to enhance their Oral Presentations. The Visual Aid may consist of a poster, handouts, brochure, PowerPoint presentation, or some other type of supplement. Originality and creativity will be encouraged.

5) Students will continue to be given a Survey at the end of the course to rate the quality and effectiveness of each Laboratory experience, and changes/deletions will be made based upon the results of this survey. This survey has proved to be a valuable tool in determining the overall effectiveness of each Laboratory experience/activity and will definitely be continued. Accordingly, students will now be awarded up to 5 additional points toward their grade for their efforts in completing the survey.

6) Last semester a Grading Rubric was created and implemented for the Oral Presentation Assignment. The Grading Rubric was popular with the students as it gave them a clearer idea of the grading criteria for the assignment, and also allowed the Oral Presentation Assignment to be graded for students in a more timely fashion. Due to its overwhelming success, this Grading Rubric will now become a permanent part of the Oral Presentation Assignment.

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

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GOAL		OBJECTIVE		ACTIONS/TASKS REQUIRED TO ACHIEVE OBJECTIVE	OUTCOMES, MEASURES, and ASSESSMENT
<b>#1</b>	Increase Student Enrollment in Geology Courses	<b>#1</b>	To Promote the Geology Profession	Work with Counselors to promote and recommend Geology courses and Geology profession to students.	Increased Fill Rates in Geology courses.
		<b>#2</b>	To Enable Students to more efficiently satisfy their educational goals (Natural Science Requirements).	Advertise the Geology courses and Geology profession (flyers).	Increased enrollment numbers in Geology Courses.
		<b>#3</b>	To Expand and Enhance the Geology Department with more course offerings and opportunities for students.	Work with PIO Director to promote the Geology Program and Geology Profession.	Increased WSCH/FTEF Ratio (Efficiency) in Geology courses.

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

Goal and Objectives: Due to the Reassigned time for the Full-time Instructor in the Geology Department to serve as the Academic Senate President, no Geology courses were offered during the 2015-2016 Academic Year. Thus, no progress has been made on this Goal or the Objectives. As this instructor will be coming to the end of his term as President this year, Geology courses will once again be offered, and progress on Goal #1 should commence as of August 2017.

GOAL		OBJECTIVE		ACTIONS/TASKS REQUIRED TO ACHIEVE OBJECTIVE	OUTCOMES, MEASURES, and ASSESSMENT
<b>#2</b>	Increase Contact, Relationships and Involvement with Adjunct faculty in the Program	<b>#1</b>	To Increase the number of planned and scheduled faculty conversations and interactions with Adjunct Faculty in the Program.	Obtain a list and contact information (phone and E-mail) for all Part-Time Faculty teaching in the Earth Sciences Program.	Documented All-Program faculty meetings.
		<b>#2</b>	To Increase discussion and dialogue between Full-Time and Part-Time faculty of	Contact and Set-up meetings with Adjunct Faculty	Minutes from All-Program faculty meetings.

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GOAL		OBJECTIVE		ACTIONS/TASKS REQUIRED TO ACHIEVE OBJECTIVE	OUTCOMES, MEASURES, and ASSESSMENT
			the Earth Science Program.		
		#3	To Increase involvement of Part-Time faculty within the Program and in the campus community.	Create Agenda for Meetings with Adjunct Faculty	Evidence of participation from Adjunct faculty in Program Review and Accreditation processes, and other involvement in the Program and campus community.

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

Objective #1: There has been some success in increasing the number of conversations and interactions with adjunct faculty in the Program. Communication and discussions in the Astronomy Department have occurred regarding use of the textbook, and students' options for the telescope-viewing requirement in the ASTR 1 course. These conversations have been facilitated for the most part by email or telephone, and there has yet to be any face-to-face meeting with the adjuncts.

Objective #2: Discussion and dialogue between the Full-time and Part-time faculty in the Astronomy Department has increased. Most of this communication has been by email or telephone. As of yet, no face-to-face contacts have occurred. One online adjunct instructor is no longer being scheduled for classes, but a new "in-class" adjunct has recently been hired at the Main Campus. Face-to-face meetings with this new adjunct will be scheduled this year to increase dialogue and discussions.

Objective #3: One of the main obstacles for making progress on this objective has been the fact that up until now all adjuncts in the program have been delivering their science classes via distance learning modalities: either Online or at Ft. Irwin. There is great hope, with the recent hire of a new adjunct at the Main Barstow College campus to teach the ASTR 1 course, that this may change. The new goal will be to encourage this new adjunct to increase his involvement on campus and within the Program. There are already plans to have face-to-face meetings, and to encourage his participation with the curriculum process.

GOAL		OBJECTIVE		ACTIONS/TASKS REQUIRED TO ACHIEVE OBJECTIVE	OUTCOMES, MEASURES, and ASSESSMENT
#3	Promote a high quality Laboratory classroom environment for Earth Science learners with the appeal of a multi-	#1	To Utilize newer and more effective Tools and Supplies in the Earth Science courses.	Purchase new Laboratory Tools and Supplies for the Earth Science Program by submitting Requisitions to Academic Affairs Office.	Assessment of measurement of Course Level Outcomes (SLOs) and Program Level Outcomes (PLOs).

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GOAL		OBJECTIVE	ACTIONS/TASKS REQUIRED TO ACHIEVE OBJECTIVE	OUTCOMES, MEASURES, and ASSESSMENT	
	faceted learning approach.	#2	To Create more Learning Environments and Interdisciplinary Teaching experiences in the Program.	Discuss with other Science colleagues the possibility of team-teaching the PHSC 1 - Physical Science for General Education - course.	Increased Retention (Completion) Rates for the courses in the Earth Science Program.
		#3	To Provide more Multi-Media and Audio/Visual experiences for students in the Earth Science courses.	Purchase new Multi-Media and Audio/Visual Aids for the Earth Science Program by submitting Requisitions to Academic Affairs Office.	Increased Success Rates for the courses in the Earth Science Program.

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

Objective #1: Substantial progress has been made on this objective. Last year, the student computers in the T-14 Earth Science Laboratory Classroom were upgraded, and we now have students access the BCC Network and Computer Applications via a Server. Not only this, but, where applicable, the computer programs were upgraded with newer state-of-the-art versions of the interactive software applications. This has already made a positive impact on the effectiveness and stability of the computer learning experiences for our students in the Earth Science Program.

There is still a need for newer and more effective Tools and Supplies for the Geology and Astronomy Laboratories, so further requisitions will be submitted this year to upgrade and/or add to our existing inventory.

Objective #2: Although no specific progress has been made on this Objective, there are still plans to create more Learning Environments and Interdisciplinary Teaching Experiences in the Program. Revitalizing the PHSC 1- Physical Science for General Education - course may be the first step in this process. The recent hiring of a new Full-time Chemistry Professor as well as an on-campus Part-time Astronomy Instructor may help to facilitate this sooner than later.

Objective #3: During the last year we have acquired additional Multimedia and Audio Visual Aids for the Earth Science Program. Specifically, we purchased new DVD's for the Oceanography Department as well as facilitating some new acquisitions by the Campus Library to be used in our Astronomy courses. Although progress has been made on this Objective, there are still deficiencies in a number of areas (such as Geology and Paleontology) that need to be addressed. Accordingly, additional requisitions will be submitted this year to add more Multi-Media and Audio/Visual aids to the educational resources in our Program.

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### 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
N/A		None Requested			
N/A		None Requested			
N/A		None Requested			