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.*

The following strengths have been identified in the Earth Sciences Program:

1) Curriculum and Course Delivery:

a. Course are offered both online and through traditional methods of instruction.

b. Convenient scheduling – mixture of daytime, evening and online course offerings.

c. Live Courses are offered in 18-week sessions.

d. Online courses are offered over three-different staggered 9-week sessions each semester to meet student needs.

e. Diversity of Courses offered. A major strength within the program lies in the diversity of the courses offered. There are courses in all of the fields of Earth Science including Geology, Astronomy, and Oceanography. In addition, there is a general introductory course in Earth Science (PHSC 2) that gives non-majors a very broad introduction to all of the Earth Science subjects.

f. Two-Year Scheduling. Earth Science courses are offered on a timely schedule that allows the student to plan for a two-year program. Introduction to Earth Science (PHSC 2) gives non-majors a very broad introduction to all of the earth science subjects, and is offered each semester. We offer GEOL 1L, Physical Geology, and OCEA 1, Introduction to the Marine Sciences, once each year. Some of the other geology courses are offered on a two-year cycle. Our most popular course is ASTR 1, Introduction to Astronomy. We offer one live section of this course and THREE online sections each semester. It is also offered during the summer. With the opening of our new Astronomical Observatory and Telescope six years ago, ASTR 1L, Observational Astronomy, has been very successful with full enrollments each and every semester.

2) Quality Instruction:

a. Experienced/Skilled/Active Full-time instructor. The Full-time Instructor has been teaching in every Earth Science department for the last 17 years and employs many different learning techniques and styles of Instruction. This instructor has also been very active and involved with every aspect of the Program as is detailed below.

b. State of the Art Computers and Software in the Earth Sciences. All of the computers in the Earth Science Classroom were replaced, and all of the Earth Science Software was updated with new versions in 2014.

c. Hands-on Experiential Learning. All of the courses in the Earth Sciences Program either have Laboratories or hands-on experiential activities associated with them.

d. One-on-One (close) Interaction with Instructor. The Earth Science Laboratory courses create a unique environment for close student-student and student-instructor interactions, and are a definite advantage that the sciences have over many other disciplines. Our small class size in the traditional live delivery courses also contributes to these close interactions.

e. Outside-the-Classroom Learning Activities. Learning opportunities outside the classroom include field trips and travel. All of our Geology courses involve field trips to local geological sites. These include travel to

Rainbow Basin National Landmark, the Mojave National Preserve, Amboy Crater National Landmark, and Pisgah Crater. Our GEOL 4 course has students visit the Los Angeles County Natural History Museum in Los Angeles. And the Astronomy courses regularly utilize our new Astronomical Observatory that involves travel to the Telescope site during class time.

3) Leadership within Program:
The Full-time Instructor in the Earth Science Program has taken a definite leadership role and has personally completed the following accomplishments within the discipline during the last Program Review period:

a) Assessed Student learning Outcomes at the Course, Department and Program Levels and implemented needed changes as a result: 2012-2015

b) Provided information input for the last Regular (full) Natural Science and Math Program Review (2012), as well as the annual Natural Science and Math Program Review Updates for each of the last two years (2013-2014 and 2014-2015) for the Earth Science Department including each of the following disciplines: Geology, Astronomy, Oceanography, and Physical Science.

c) Evaluated three part-time adjunct instructors in the Astronomy Department: 2012 -2014.

d) Managed budgets and purchased new and replacement equipment/ supplies for the Astronomy, Geology, Oceanography and Physical Science departments for the last three years. This included purchases for equipment and supplies for Geology Laboratory Activities and Field Trips: 2012-2015

e) Researched, wrote proposal, and drafted Budget Allocation Proposal (BAP) for replacement of ALL computers (17) in Earth Science Department Laboratory Classroom (T14): Fall 2012.

f) Researched, wrote proposal, and drafted Budget Allocation Proposal (BAP) for significant Upgrade and Update of ALL computer software programs (15) for Earth Science Department Laboratory Classroom (T14): Fall 2012.

g) Supervised two major and three minor repairs to the Astronomical Observatory: 2012-2014.

h) Performed repairs and replaced parts on main 16" Schmidt- Cassegrain Reflecting Telescope located in BCC Astronomical Observatory: 2012-2015.

i) Collimated (aligned) 16" Schmidt-Cassegrain Reflecting Telescope in Astronomical Observatory. Periodic Collimation is necessary due to regular use: April 2015.

j) Upgraded 16" Schmidt-Cassegrain Telescope and Pier located in BCC Astronomical Observatory by installing Dew Shield, Eyepiece Holder, Equipment Hook, and Equipment Shelf: 2013-2015

k) Purchased New Astronomy Supplies and Equipment for our Astronomical Observatory and Telescope including an assortment of high-grade Eyepieces and Filters: 2012-2015

l) Individually Tutored, on a weekly basis, a total of 18 students in the areas of Geology, Astronomy, Oceanography, and Physical Science over the three years of the review period: 2012-2015.

m) Wrote 27 Letters of Recommendation for students from courses in the Earth Science Program for College Admissions/Scholarships/Employment Applications over the review period: 2012-2015

4) Facilities:

a) Co-Lab Science Laboratory. The Co-Lab has 16 stations that can accommodate up to 2 students each. There is Electricity, Water, Gas, and compressed Air at each Station. Each station also has a State-of-the-Art Computer that can be shared by two students. Teaching in the Co-Lab allows for more activity-based, hands-on, experiential learning to take place.

b) Astronomical Observatory. Our Astronomical Observatory that houses our 16" Schmidt-Cassegrain Reflector Telescope is now in its Sixth year of successful operation. It is used for instruction in all of our Astronomy courses and occasionally for the PHSC 2 course as well.

5) Community Service and Outreach to the Public:

a) Organized and Conducted the following Public Telescope Viewing Events at the BCC Astronomical Observatory for the Barstow Community:

I) Telescope Viewing of Jupiter and its Four Moons
Tuesday, March 19, 2013, 7:30 - 10:00 p.m.

II) Telescope Viewing of the Waxing Gibbous Moon
Thursday, November 14, 2013, 6:00 - 9:00 p.m.

III) Telescope Viewing of Mars
Thursday, April 24, 2014, 8:00 - 10:30 p.m.

IV) Telescope Viewing of a Solar Eclipse
Thursday, October 23, 2014, 2:30 - 4:30 p.m.

V) Telescope Viewing of Jupiter and its Four Moons
Thursday, April 16, 2015, 8:00 - 11:00 p.m.

VI) Telescope Viewing of the Supermoon Total Eclipse of the Moon
Sunday, September 27, 2015, 6:30 - 10:00 p.m.

b) Organized, led and conducted the following Week-End Geology Field-Trips:

I) Field Trip to Rainbow Basin and Owl Canyon
Saturday, December 1, 2012, 9:00 a.m. - 6:00 p.m.

II) Field-Trip to Pisgah and Amboy Crater Volcanoes
Saturday, November 23, 2013, 9:00 a.m. - 7:00 p.m.

c) Donated time at Desert Discovery Center, 2013-2014.

d) Identified Rock, Mineral and Fossil Specimens from 35 members of the Barstow Community (2012-2015)

6) Press and Recognition:

a) Full-Time Instructor Highlighted in "Profiles in Learning" campaign via Website and Posters displayed around campus. Emphasis was placed upon instructor's use of experiential learning (utilizing the Science Laboratory and Astronomical Observatory) to complement traditional book learning. 2012 - Present.

b) Full-Time Instructor and Program profiled in first issue of Career Focus Magazine. Article entitled "Teaching with a Passion" outlined instructor's focus on experiential, activity-driven, hands-on learning in the Earth Science Program. Attention was placed on the authentic assessment of learning from real-life settings such as Filed-Trips to local Geological sites. Fall 2013/Spring 2014.

CONCLUSION:

The overall general state of the Earth Science Program is that it is healthy, and has a positive and productive future ahead as it continues to grow. Our Astronomy Program, as highlighted in the College's 2011 Educational Master Plan, has become the most productive aspect of the Program, and projections within the plan tell us that there will be continued growth in this area. The Public Viewings with our Telescope at the Astronomical Observatory for the Barstow Community have become extremely successful generating crowds of at least 200 people each time. There has also been recent press and recognition of the Earth Science Program as highlighted above. All of the above factors have greatly contributed to the generally high Course Retention and Success Rates cited in Section 3.A of this Program Review. We are proud of these aspects of the Earth Science Program that have led to such great progress, recognition, and success.

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.*

1) Lower Enrollments in Geology Courses. Enrollments in Geology courses are lower than in the past as evidenced by the following:

WSCH/FTEF Ratio (Efficiency):
GEOL 1L: 154.05
GEOL 4: 285

Fill Rate:
GEOL 1L: 0.63
GEOL 4: 0.59

In the past these numbers have been stronger so there is definite concern about this decline. Action will need to be taken during the next Program Review Cycle period to improve enrollments in the Geology courses.

2) Lack of Contact, Relationships and Involvement with Adjunct Faculty in the Program. Communication between Full-time and Part-time instructors in the Program is not occurring on a regular basis. This has caused problems with respect to participation from Adjunct faculty in Program Review and Accreditation processes, and other involvement in the Earth Science Program and the campus community as a whole.

3) Lack of Proper/Current Tools and Supplies for the Earth Science Courses. The Program is in need of newer and more effective Tools and Supplies for classroom instruction in all Departments of the Earth Sciences, but particularly in the Geology and Oceanography areas. Many consumable supplies for the Geology Laboratory courses must be replaced on an annual basis. In addition, many of the non-consumable tools and supplies for classroom instruction are not state-of-the-art, and should be replaced to keep the courses current and interesting for students. New Multi-Media and Audio/Visual Aids for the Earth Science Program are needed in order to enhance learning and the overall educational experiences for our students. Most of our Audio/Visual aids in the Oceanography Department are 25-30 years old, and are no longer appropriate to be utilized in the classroom.