Chaffey College Program Review
Three Year Review 2011

PROGRAM OVERVIEW

Program Title: Earth Science
Program Code: 1914 - GEOLOGY AND EARTH SCIENCE
Review Type: Instructional

Does this review contain any career technical education (occupational) programs?
No

External Regulations:
No

Chaffey College Mission Statement
Chaffey College improves lives within the diverse communities it serves through equal access to quality occupational, transfer, general education, and foundation programs in a learning-centered environment where student success is highly valued, supported, and assessed.

Please describe how your program supports the college’s mission and discuss how your program evaluates its effectiveness in meeting the college mission:
The mission of the Earth Science Program is to teach Earth Science courses to our diverse student population. Our students are primarily non-science majors who take Earth Science courses to fulfill their physical science transfer or degree requirement. Earth Science provides a learning-centered environment where student learning is enhanced by hands on labs, field trips and lively discussions of current events in science. Strategies for student success are continously discussed by faculty and measured by learning outcomes.

Review Team Response
The Program Overview clearly links to the college’s mission. It illustrates the Earth Science program’s commitment to Chaffey's diverse student population, especially non-science majors who take Earth Science courses to fulfill their general education requirements. Similarly, it links its student success measurements to the student learning outcomes.

PROGRAM DATA
## Enrollment

### Enrollment by Day, Evening, Online, Arranged (ESC)

<table>
<thead>
<tr>
<th>Measure</th>
<th>2008-09 to 2009-10</th>
<th>2009-10 to 2010-11</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Census Enrollment</td>
<td>-1.94%</td>
<td>-21.46%</td>
</tr>
<tr>
<td>Day</td>
<td>-0.29%</td>
<td>-18.74%</td>
</tr>
<tr>
<td>Evening</td>
<td>-5.6%</td>
<td>-27.85%</td>
</tr>
<tr>
<td>Online</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Arranged</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Enrollment Details

<table>
<thead>
<tr>
<th>Year</th>
<th>Total</th>
<th>Day</th>
<th>Evening</th>
<th>Online</th>
<th>Arranged</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008-09</td>
<td>1497</td>
<td>1033</td>
<td>464</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2009-10</td>
<td>1468</td>
<td>1030</td>
<td>438</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2010-11</td>
<td>1153</td>
<td>837</td>
<td>316</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Enrollment Measure

- **Total Census Enrollment**: The measure shows a decrease of 1.94% from 2008-09 to 2009-10 and 21.46% from 2009-10 to 2010-11.
- **Day**: The decrease is 0.29% from 2008-09 to 2009-10 and 18.74% from 2009-10 to 2010-11.
- **Evening**: The decrease is 5.6% from 2008-09 to 2009-10 and 27.85% from 2009-10 to 2010-11.
- **Online**: The data is not available.
- **Arranged**: The data is not available.
Given the data, what changes can be identified in enrollment patterns? Identify any important trends and explain them.

Earth science has unfortunately suffered a disproportionate level of cuts compared to other departments during this recession. During enrollment, our classes fill long before most departments on campus and many students are turned away. Our enrollments by ethnicity and gender mirror the campus averages which would be expected because our courses are taken by a wide range of non-science majors.

Retention
## Retention Rate by Day, Evening, Online, Arranged (ESC)

<table>
<thead>
<tr>
<th>Measure</th>
<th>2008-09 to 2009-10</th>
<th>2009-10 to 2010-11</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Census Retention</td>
<td>-1.14%</td>
<td>2.51%</td>
</tr>
<tr>
<td>Day</td>
<td>-0.71%</td>
<td>2.85%</td>
</tr>
<tr>
<td>Evening</td>
<td>-1.82%</td>
<td>2.12%</td>
</tr>
<tr>
<td>Online</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Arranged</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Given the data, what changes can be identified in retention patterns? Identify any important trends and explain them.

All of the retention rates are well above school averages and fluctuated for both day and evening classes by insignificant amounts. The evening retention rates are from just one section whereas the daytime sections numbers are averaged from at least 4-5 instructors teaching at least 6 classes. The fluctuation in retention numbers if significant only reflect the changes in classes assigned to different adjuncts. I expect that these retention numbers will jump up and down in future years around the 90% level.

Success
Given the data, what changes can be identified in student success patterns? Identify any important trends and explain them.
Success rates in Earth Science are all well above college wide averages and there are not very large differences between the different ethnic groups or genders. Again, evening success rates are higher but this reflects one lecture taught by one instructor whereas daytime success rates reflect an average of at least 4-5 instructors teaching more than 6 classes.

Review Team Response
Data and trends are interpreted properly. Implications for the program are included. Data is effectively used to explain current enrollment and retention patterns. Similarly, student success rates are clearly stated, delineating the differences found between day and evening classes success rates.

DEGREE/CERTIFICATE DATA

<table>
<thead>
<tr>
<th>Term</th>
<th>Degrees</th>
<th>Certificates</th>
</tr>
</thead>
<tbody>
<tr>
<td>07/08</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>08/09</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>09/10</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

Given the data, is the number of majors and certificates what you would expect? Please comment. Has the number of majors and certificates increased or decreased over time? Why?

One Earth Science degree was awarded to a student in 2008/2009 and none since then because students take earth science classes to fulfill their physical science transfer or degree requirement. Earth science is not a common undergraduate major (geology is slightly more common and is now a TMC at Chaffey).

Review Team Response
Data is effectively used to explicate the amount of degrees awarded and the factors behind it.

STUDENT LEARNING OUTCOMES
Distinguish between scientific arguments and those generated by other ways of knowing.

Use laboratory equipment and procedures to experience previously unfamiliar aspects of the physical world.

Discuss how the number, type, depth, and breadth of the courses support program SLO's.
The full number of SLO's is not showing in this report and they are in the Attached Files. Earth Science currently offers two courses, Earth Science Esc-1 and Oceanography Esc-5 both which include optional labs. Each supports all of Earth Science's program level SLOs, which is appropriate because each is a free-standing transfer or degree level general education course. See the Program Level SLO Curriculum Mapping Grid and Program SLOs to Core Competencies Mapping Matrix in the Attached Files.

Discuss how courses in the program articulate with or complement each other.
Students usually take only one Earth Science course, because either one is sufficient to meet the physical science general education requirements. While subject matters differ, the level of Esc-1 and Esc-5 is comparable. In either course, students are introduced to and practice all Earth Science SLOs (except that the lab SLO pertains only to the lab course).

Discuss how courses in the program interact with other programs on campus (for example: cross-listing, overlapping content, or shared resources).
Earth science courses are stand alone courses primarily for non-science majors. Education majors are required to take earth science and the subject matter is part of the CSET exam for teachers. The department occasionally loans or borrows equipment from Geography, Astronomy, Physics and Chemistry and shares lab space at the Chino and Fontana Centers.

How and when has your department assessed Program SLO's' and how have you responded to the
The department is actively assessing course level SLO's each semester and adjusting instruction in accordance with the results. Program level SLO's are continuously reviewed but at this point they are successful but they could be revised at some future point if data indicates. Our 4 program level SLOs match Chaffey Colleges Core Competencies of Communication, Critical Thinking and Community Awareness. (Please note that the question for this section is very differently worded in the Word document version versus the PSR pencil icon section.)

What program or course changes have been made based on the result of the assessed outcome?
The department uses Curricunet's Summary of Evidence and Use of Results to report our findings from SLO assessment. SLO reports have led the faculty to increase the variety of minerals and rocks in the student lab exercises, increase geological field trip offerings, and encourage lecture instructors to address differing cognitive styles in learning.

Review Team Response
Overall Program Level Implementation of SLOs is Developmental: The program has established a framework for defining SLOs (where to start), how to extend and timeline. The program has established authentic assessment strategies for assessing SLOs. Program faculty members are engaged in SLO development. You, your coordinator and your dean will receive a detailed letter outlining the areas that need to be addressed for SLOs.

Discuss how your services help maintain a high level of student satisfaction.

Discuss how you evaluate your effectiveness in meeting students' needs.

How and when has your service reviewed or revised SLO?s and/or AUO?s.

How has your program utilized SLO/AUO assessment results for program improvement?

Review Team Response

CURRICULUM UPDATE

<table>
<thead>
<tr>
<th>Courses</th>
<th>Last Modified</th>
</tr>
</thead>
<tbody>
<tr>
<td>ESC 5 Oceanography - Active</td>
<td>12/13/2006</td>
</tr>
<tr>
<td>ESC 1 Earth Science - Active</td>
<td>12/13/2006</td>
</tr>
<tr>
<td>ESC 5L Oceanography Laboratory - Active</td>
<td>10/27/2010</td>
</tr>
<tr>
<td>ESC 1L Earth Science Laboratory - Active</td>
<td>10/27/2010</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Programs</th>
<th>Last Modified</th>
</tr>
</thead>
<tbody>
<tr>
<td>ESC Earth Science - Active</td>
<td></td>
</tr>
</tbody>
</table>
Courses should be updated every six years; if course updates are due, please describe your plan and timeline for updating courses:
Esc1 and Esc5 will be updated this summer. Esc8 is currently being deactivated. The Earth Science major (which is not at recognized TMC major) needs to be rewritten this summer to reflect course deactivations and changing requirements at the Cal States and UC.

What steps has your program taken to proactively respond to changing and emerging student and community needs?

Briefly explain:
Earth science is successfully offering courses that are in very high student demand (our Esc-1 courses are among the first to fill on campus during registration) because they meet the needs of non-science majors requiring a physical science to transfer or complete degree requirements. Hopefully, we can offer more courses in the day and evening once the state budget improves.

Review Team Response
Informative, detailed and concise. Clearly explains the curriculum's current situation and future expectations.

Review Team Response

NON-INSTRUCTIONAL PROGRAM INFORMATION

How does your program improve, expand, or support student learning? How do you know?

Describe staff functions and services (these can include diversity, specialties, staff preparation and training, professional activities and committee participation, accomplishments, grants, new programs etc.)

How does your program evaluate its effectiveness?

Review Team Response

STUDENT SUPPORT - ACCESS

How do the services you provide to students facilitate access to learning? (e.g. - admissions applications, payment processing, pre-requisite clearances, assessment testing, adaptive technology, program applications, healthcare, student activities, and other specialized services.)

<table>
<thead>
<tr>
<th>Type of Service</th>
<th>Description of Service</th>
<th>How many students received this service?</th>
<th>Measured with?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>08-09 09-10 10-11</td>
<td></td>
</tr>
</tbody>
</table>
Additional information:
Review Team Response

STUDENT SUPPORT - SUPPORT
How do the services you provide to students support student learning? (e.g. 'counseling, orientations, workshops, financial assistance (scholarships, grants, etc'), career assessments, health education, service learning, advisory committees, and other specialized services.)

<table>
<thead>
<tr>
<th>Type of Service</th>
<th>What knowledge, skills, and/or abilities are learned?</th>
<th>How many students received this service?</th>
<th>Measured with?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>08-09 09-10 10-11</td>
<td></td>
</tr>
</tbody>
</table>

Additional information:
Review Team Response

STUDENT SUPPORT - OTHER
How do the services you provide to students promote transfer, completion, specialized services, and/or future success? (e.g. graduation ceremony, CSU/IGETC certifications, university transfer, securing employment, transcript requests, enrollment verification, conferring of degrees/certificates, scanning/imaging documents, phone calls received, face-to-face contacts, refunds granted, and other specialized services.)

<table>
<thead>
<tr>
<th>Type of Service</th>
<th>How does this contribute to student success?</th>
<th>How many students received this service?</th>
<th>Measured with?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>08-09 09-10 10-11</td>
<td></td>
</tr>
</tbody>
</table>

Additional information:
Review Team Response

VISIONARY IMPROVEMENT PLAN(VIP)
Please identify 1-3 program improvement goals for the next three years. Goals should state 'what' you plan to achieve and the rationale 'why' for doing so. 'How' you achieve your goals will be entered under Steps to Success. Keep in mind that your VIP should be SMART:

- Specific
- Measurable
All plans should improve or expand student learning.

Year Three Goal:
Improve hands-on laboratory offerings at Chino and Fontana to match those offered at the Rancho Campus. Students need active learning labs where they perform experiments and examine rocks, mineral, map and fossil collection at Rancho Campus. Consult with adjuncts assigned to teach Esc-1 and Esc-5 labs to incorporate these materials into more hands on labs. Monitor student progress in terms of the lab SLO for both Esc-1 and Esc-5: Use laboratory equipment and procedures to experience previously unfamiliar aspects of the physical world.

To which planning direction does this goal apply?
Excellence in teaching and learning

Year 1 Steps to Success (activities) and VIP Assessment:
Use existing student workers to enhance lab supplies at Chino and Fontana from pre-existing rock, mineral, map and fossil collection at Rancho Campus. Consult with adjuncts assigned to teach Esc-1 and Esc-5 labs to incorporate these materials into more hands on labs. Monitor student progress in terms of the lab SLO for both Esc-1 and Esc-5: Use laboratory equipment and procedures to experience previously unfamiliar aspects of the physical world.

Year 2 Steps to Success (activities) and VIP Assessment:
Continue to increase the numbers of hands on labs at the Chino and Fontana Centers. Monitor student progress in terms of the lab SLO for both Esc-1 and Esc-5: Use laboratory equipment and procedures to experience previously unfamiliar aspects of the physical world.

Review Team Response
The goals are clear, concise, attainable, measurable, and are clearly tied to data and SLO assessment results. They follow the handbook instructions: First, describe your goal with a verb. Next, include what you plan to achieve (what) and the rationale (why) in one sentence. The goals are clear and effective. The steps to success are linked to the goals and clearly state the activities to take place each year in order to reach the desired objective. The activities are concise, clear, and reachable, focused on improving the students’ academic success.

PROFESSIONAL DEVELOPMENT ACTIVITIES THAT SUPPORT STUDENT LEARNING OR IMPROVE YOUR PROGRAM

List Recent departmental professional development activities connected to student learning.

<table>
<thead>
<tr>
<th>Recent activities</th>
<th>Recent workshops/courses taken</th>
<th>Recent conferences/training</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learning to Learn 1/13 Jeff Hebron</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
How are student learning outcomes affected by these professional activities? What steps are recommended for improvement?
Learning to learn emphasized how to motivate students and the Show and Tell for Teachers featured a variety of teaching strategies to engage student attention. SLO's benefit from a more student centered learning experience that these activities promoted.

Discuss departmental engagement on campus in connection to student learning.

<table>
<thead>
<tr>
<th>Governance committees</th>
<th>Other college-related committees</th>
<th>Other campus participation</th>
</tr>
</thead>
<tbody>
<tr>
<td>504 Compliance Committee</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hiring committees</td>
<td>Leading frequent student field trips on weekends to enhance student success.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Individual Honor's contracts.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Numerous faculty evaluations.</td>
<td></td>
</tr>
</tbody>
</table>

How does your program benefit from your campus engagement?
Earth science enroll is a large number of DPS students ensuring ready access to facilities is essential.

Teaching/Years of Service

<table>
<thead>
<tr>
<th>Teaching/Years of Service</th>
<th>Earth Science</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-5 years</td>
<td>0</td>
</tr>
<tr>
<td>6-10 years</td>
<td>0</td>
</tr>
<tr>
<td>11-15 years</td>
<td>0</td>
</tr>
<tr>
<td>16-20 years</td>
<td>0</td>
</tr>
<tr>
<td>21+ years</td>
<td>0</td>
</tr>
</tbody>
</table>

Given the data how has your program been impacted?
There is one full time tenured instructor (Jane Warger) with 8 years full time experience and for 2011-2012 one full time temporary instructor (Jeff Hebron). Earth science has 2 labs on the main campus and one each at Chino and Fontana. There is a great need for another full time tenured instructor to help with the department's work.

Does your program anticipate retirements within the next 3 years?
No.

Review Team Response
All the professional activities focus on improving students' academic success through constant departmental communication and campus engagement.

PROJECTED NEEDS
Is any part of the program funded by sources other than the instructional budget (such as grants, partnerships, or other means)? If yes, please identify the source, amount, and length of funding.

After reviewing and analyzing the data and assessment results in this report, please describe and provide rationale for any projected resource needs required to accomplish your Visionary Improvement Plan using the boxes below. Your requests should be based on student need.

**FT Faculty:**

**Year 1:**
1 FTE Faculty in Earth Science/Geology

**Hiring Criteria:**

**Institutional Level Considerations**
- Supports Chino expansion
- Supports Fontana expansion
- Student need for courses or programs for transfer or vocational certificate

**Department Concerns**
- Adjunct to FT ratio is extremely skewed (note: The 75/25 ratio state mandate is campus wide not per department)
- Adjunct faculty are difficult to find (quality and qualified, high turnover, specific skill sets, external agency licensure requirements)
- Department has one FT faculty and course load, outside reporting (e.g., advisory committees) & responsibilities, etc. requires another FT faculty member.

**Year 2:**

**Hiring Criteria:**

**Year 3:**

**Hiring Criteria:**

**STAFF**

**Year 1**
1 Instructional Assistant IV Range 13, $3,093/mos

**Year 2**

**Year 3**

**EQUIPMENT**

**Year 1**
Review Team Response
The program’s projected needs have been clearly stated at the appropriate areas.

Review Team Response
The program contains excellent information and analysis to be useful for planning, supporting and improving student achievement and SLO’s. The review contains clear, measurable goals and resource requests. The program review is clear, concise, attainable, measurable, and clearly tied to Chaffey’s mission statement and student learning outcomes. The program followed the handbook instructions and the advice from the reviewers. The goals are clearly described followed by clear, concise, attainable steps for success. Data was effectively used to support their commitment to students’ success.