

EARTH SCIENCES DEPARTMENT

Geography/Geology/Oceanography

Fall 2019

Full-Time Department Faculty Members:

Tim Cliffe

Judd Curran

Mark A. Goodman

Gary Jacobson

Anne Teachout

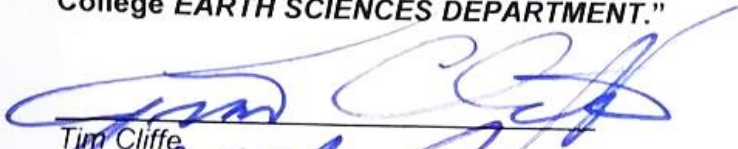
Scott Therkalsen



GEOG 121 Physical Geography: Earth Systems Laboratory

SIGNATURE PAGE:

"This program review report for 2013-2019 is respectfully submitted by the members of the Grossmont College EARTH SCIENCES DEPARTMENT."



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DEPARTMENT/PROGRAM ACADEMIC PROGRAM REVIEW

SECTION 1 – OVERVIEW.

DEPARTMENT HISTORY & PREVIOUS PROGRAM REVIEW RECOMMENDATIONS

PURPOSE OF SECTION 1.1: To help the committee understand the history of the department, what your department does, what population you serve, and your overall place in the college. Include any information that helps the reader understand your department, such as which courses are primarily GE, programs added, new degrees, certifications, where your students come from, where they go, and a description of your faculty (the role of FT, PT and staff). Student population specifics (transfer, basic skills, CTE, etc.) are useful as well.

Geography and Geology, established as disciplines at the inception of the college in 1961, became part of the current Earth Sciences Department in 1972. Within the newly-formed department, Lee Englehorn and Wayne Harmon (starting in 1967) taught the geography course offerings, while Ray Resler taught the General Geology lecture and lab. Historical Geology, a major's course, was added to the geology curriculum in 1968. A major's Physical Geology 120 (lecture/lab) course was also offered but was eventually discontinued because of overlap with General Geology.

Explosive growth campus-wide prompted expansion of the department in the early 1970's with the hiring of two more full-time geographers (Lee Shadell and Mike Matherly) and another full-time geologist (Shannon O'Dunn). The Geography curriculum grew with the addition of a Physical Geography Lab, Meteorology, California Geography, and an Urban Technology program, creating the largest such program of any offered within California's community college system at the time. The Geology curriculum also expanded, adding two 4-unit field-based courses (National Parks and California Geology) in 1972. Mineralogy was also offered but low enrollments forced its cancellation. In the mid-1970s, a cross-disciplinary Oceanography course was developed, eventually evolving into two separate courses, Marine Biology and Physical Oceanography.

By 1980, major funding, demographic, staffing and job market changes prompted many changes in the Earth Sciences Department. Proposition 13 eliminated funding for the full-time technician who had archived and reported Grossmont College weather station data. The Urban Technology program and the Economic Geography course were dissolved though Urban Geography (Geog160) was retained as a strong General Education (GE) course.

On the personnel front, Shadell retired in 1983 and was replaced by adjunct faculty. O'Dunn left the Department to write grants for the District in 1986 (later returning in 1991). General Geology sections were reduced and Oceanography emerged as an extremely popular alternative and as a result of growing demand, Gary Jacobson was hired in 1989 as a Geology-Oceanography instructor to fill the gap. The 1990's saw the retirement of Lee Englehorn who was replaced by Tim Cliffe in 1991. Ray Resler retired in 1995, followed by Wayne Harmon in 1997. Mark Goodman was hired as a full-time replacement for Wayne Harmon in the fall of 1999. In the summer of 2000, Shannon O'Dunn left the Department once again to take a position as a Dean (Communication and Fine Arts) and thus, Chris

Hill was hired to replace O'Dunn in the fall of 2002. The senior member of the Department, Mike Matherly (Geography) retired in the spring of 2005 and was replaced by Judd Curran in the spring of 2006. The long-awaited replacement for Shadell, Scott Therkalsen, was hired on a series of 1-year contracts in 2007 and 2008 and became permanently full-time in the fall of 2009. This finally returned the Geography Department to its previous full-timing staffing level. Within a few years of starting at Grossmont College, Chris Hill moved into a variety of administrative positions. Ultimately, Hill left Grossmont for an administrative position at Mira Costa College. In the fall of 2019, former adjunct instructor Anne Teachout was hired as a full-time tenure-track instructor in Geology and Oceanography. As of this writing the Earth Sciences Department has a full complement of full-time instructors in Geography, Geology, and Oceanography—something that had not been achieved for many years.

In the early 1990's, Resler's two long-running field classes (Geology of Nat'l Parks, Geology of CA) were cut by then Vice President Daniels who suggested that instead the new "World Wide Web" could be used to conduct "Virtual Field Trips." By 1999 O'Dunn and Dean Bill Bradley pushed for initial funding of a team-taught, interdisciplinary field course (GEOG/GEOL/OCEA/BIO 150: Field Study of the Natural History of the Greater San Diego Region). This course is offered during the spring semester only to take advantage of weather and plant blooms and was first developed jointly by O'Dunn, Matherly, Cliffe, Jacobson, Goodman, and Joe Henry from the Biology Department. The course has proved to be popular over the years.

Throughout the first decade of the millennium, the Department began expanding its field course offerings which eventually included four summer field courses: the Eastern Sierra field course was first taught in the summer of 2007 by Curran, the Colorado Plateau field course, was offered initially in the summer of 2009 by Hill and Therkalsen. Hill and Therkalsen also developed and the taught the Cascade Range/Modoc Plateau field course first in the summer of 2010, and a California Coast Range field course was first offered in the summer of 2015 by Cliffe, Curran, and Goodman. With the passage of time, some rearrangement of faculty teaching these courses has taken place. As of this writing, Curran and Cliffe conduct the Eastern Sierra course, the Colorado Plateau and Cascade Range/Modoc Plateau courses are still taught by Hill and Therkalsen, and the Coast Range course is taught by Cliffe and Goodman. In addition, several one-weekend field courses (e.g., Jacobson's Catalina Island and Hill's Eastern Mojave Desert) were developed, offered, and taught. These field courses are popular and attract good, motivated students. In fact, there have been numerous instances where some of our former students, having moved on to a four-year institution or graduated and gotten a job, have come back to Grossmont to take a specific field course because of their high quality. Various students over time have stated that the quality of the field course offerings within the Earth Sciences Department is above some of the field experiences they have had at four-year institutions.

Jacobson developed a distance education course entitled Geology of National Parks (first offered in the spring of 2007), and in the fall of 2007, Geology 110 went through a name change from "General Geology" to "Planet Earth" in an attempt to capitalize on changing societal attitudes to increase enrollment; it was also briefly offered through distance education by adjunct faculty. The Geographic Information Systems course begun by Goodman around 2000 was also updated into a hybrid lecture/lab course by Curran that articulated with San Diego State. This took place in the spring of 2007. Starting with the Spring 2015 semester Curran and Goodman began team teaching the course

with great success. The team-teaching format works out very well as the instructors take turns lecturing on different topics. Students like the format as well and enrollments have increased along with the new teaching format. Team teaching in a course such as this that relies on computers and computer software is beneficial in that problems that occur can be addressed quickly and easily and thus work to eliminate any anxiety and frustration students might feel or encounter when things don't work right. For example, if one instructor is guiding students through a series of geoprocessing steps in the computer via the data projector, the other instructor can roam the lab space, ensuring all are following directions and is able to assist students who have problems. In this way, students who need help get immediate help and the demonstration is not disrupted for others. Additionally, meaningful web-based activities and assignments were incorporated into the class.

With time, "Prop R" funding dramatically upgraded campus facilities for many departments, but eliminated the building that housed the Department's dedicated classrooms. Only a new Earth Sciences laboratory was created in the New Science building (Building 30) in the spring of 2007, but unfortunately without a dedicated GIS lab. The following year, Spring 2008, the Earth Science lecture facilities were demolished and classes were moved into inadequate temporary trailers. We were forced to teach in these horrible spaces from Fall 2008 through Spring 2010 after which there were, unfortunately no funds to implement the planned reconstruction of Building 36. Working closely with facilities the Department was able to secure reasonable (although not ideal) lecture facilities in the temporarily-renovated building 36.

In the fall of 2019, the Department was notified that its long-standing office space (affectionately known as the "hovel") was slated for demolition. The Department was further instructed to have everything packed up and ready to move out by December 20, 2019. The timing of the packing, the move out, and the move in was not ideal as the semester and final exams were winding down and faculty did not have access to the new spaces until the start of the Spring 2020 semester. Accessing the new spaces were difficult as there were issues with construction work continuing to take place in the 100 modular village area and locks and keys were unavailable, (not all faculty members had keys at the start of the Spring 2020 semester). The new space office that came to be occupied by Goodman and Therkalsen was not even wired for internet access at the start of the semester, lighting in the room was an issue, and less space in general created problems in attempting to unpack and take up residence all while starting the new semester. The beginning of Spring 2020 was a challenge indeed.

While the Department has taken up temporary residency in the Building 100 modular village on the East side of campus south of the parking structure, Building 36 is to undergo a complete rebuild. The Department has attended numerous meetings regarding the design and rebuild of Building 36 and many of the Department's suggestions are supposed to be incorporated in the final product, some of which can be used as outdoor learning spaces (e.g., a staircase depicting the Geologic Time Scale and ecosystem-specific plant panels). This is keeping in line with previous efforts by the Department such as our work with facilities in the design and installation of a series Geography/Geology rock and vegetation specimen gardens that have already proven useful for field course orientations, lab class exercises, and faculty professional development purposes (Spring 2012).

As all are aware, difficult financial times began in 2008 and the state began defunding education causing sections to be cut college wide. These "across the board" cuts continued through the writing

of this document and have had an extremely negative impact on the Department's enrollments. Since 2008 there has been a substantial section reduction in courses taught within the Earth Sciences Department. As of Fall 2011 nearly all Geography adjunct positions were eliminated and reductions in Oceanography and Geology adjunct positions have occurred as well. Continued cuts put the Department at a breaking point in that additional cuts will make it impossible for all full-time faculty to maintain a 1.0 full load, and will erode the foundational core of course offerings that are essential to provide reasonable access to program pathways for all students. Cliffe has met the administration's request for campus-wide instructional flexibility by successfully teaching across disciplines into Geology. Other members of the Department have met load by serving in positions or campus committees for which release time is available—a fix which is not viewed by the Department as a long-term solution in meeting with the College's stated mission to "provide an exceptional higher education learning environment through **comprehensive and innovative instructional programs** and student support services.

Despite numerous issues with which the Department has been forced to deal with (e.g., resisting senseless course and section cuts that erode academic quality and academic program viability, moving lecture and office spaces several times (and still not in permanent, ideal facilities, etc.) the Earth Sciences Department continues to offer top-quality, meaningful courses which stress the application of foundational principles (physical and social) germane to the Earth system while enhancing access and success for all students. These courses have attracted some high caliber students over time, who turn out to be great ambassadors for us, spreading the good word to a wider audience about the quality education one can receive through our courses. Many of our students have gone on to find gainful employment within the many fields covered by our Department. The following is a list (in no particular order) of some of the agencies and organizations that have hired Earth Sciences Department students, at least those who have maintained contact with the Department after leaving Grossmont: San Dieguito Park Ranger, San Diego County GIS, San Diego County Office of Health and Human Services GIS, Wildland Fire Manager, US Geological Survey, National Weather Service, Mission Trails Regional Park Docent, City of San Diego GIS intern, Head Ranger at Mission Trails Regional Park, Head of Surface Water in California with the California Water Science Center, City of Santee Stormwater program, San Diego Gas and Electric (Environmental Sustainment), and various colleges.

PURPOSE OF SECTION 1.2: To help the committee understand what the last program review recommendations were, and how your department addressed and implemented them.

2. Your last program review contains the most recent Academic Program Review Committee Recommendations for the program. Describe changes that have been made in the program in response to recommendations from the last review including any activity proposals funded and what the results were. (Be sure to use the committee recommendations and not your own). Include the recommendations from the last program review in this section.

The Program Review Committee recommended the following during the last Program Review.

- Develop a job description for a shared technician with Chemistry and pursue hiring as programs expand.

SOMEWHAT COMPLETE. This position was ultimately approved as an Earth Sciences Technician only. That is, not in a shared capacity with Chemistry. Initially, Krissy Lovering was hired in the fall of 2015 but resigned after a couple of years to spend more time with her

newborn. In the fall 2018, Julie Burcham was hired as a replacement for Krissy. It has recently become apparent that the job classification that was used to hire for this position was not the one that was specifically created by the Department and approved by HR to hire that which is a unique technician position for Earth Sciences and thus, is not currently tailored in the manner consistent with Department expectations. This mistake necessitates the reclassifying of this position with the correct job description necessary to run Department programs and should ultimately require a rehire process.

- Restore funding for field classes.

COMPLETE. In Fall 2007 the full transportation budget for Earth Sciences field courses was restored. As field experiences constitute the application of the knowledge gained in the Earth Sciences, the restoration of the transportation budget line item has allowed students the opportunity to develop their practical skills in the observation, measurement, and interpretation of natural phenomena. The budget allows the department to offer a full suite of courses (when FTES goals allow) within an academic year that include two one-unit weekend courses to various areas of geologic interest in Southern California, a cross disciplinary three-unit course on the Natural History of San Diego County, and a three-unit, week-long course to areas outside of southern.

- Fund the purchase of necessary supplies and technology.

COMPLETE. This is ongoing on a yearly basis.

- Continue working with the Facilities Committee to secure appropriate work, office, storage space as well as a large lecture classroom.

INCOMPLETE. Most of our facilities have been inadequate for quite some time. Those in Building 36 (Rooms 353, 354, and 355) were not to our specifications when we were placed into that building. As a result, we ended up with one class that is too large (room max of 75 while our course max is 50) and one that is too small (room max of 40). Because of the size of the large room certain portions of the whiteboard are difficult to read from certain parts of the room; this is a particularly important problem for our department because of the stress we place on note taking utilizing the whiteboard. This large room can also leave the class with an “empty” or “dying” feeling with large barren areas of the room especially as the classes thin out. Fortunately, we were able to make some adjustments to this room including installing a stage, moving a Smart-cart and providing large tables to enhance student note taking. Unfortunately, the other two rooms do not have a raised area for lecture and it becomes nearly impossible for all students to see all portions of the whiteboards, especially in the small “galley” classroom. The size of these other rooms also prohibits the large desks we require. In addition the climate controls in these classrooms do not function properly and the lighting arrangement is not the best design to accommodate our needs. Facilities has done their best to work with us to address as many issues as possible but currently our classrooms are our greatest hindrance to student success. In class, lecture is the primary component of our programs (as opposed to group work or student presentations or online work) and this is why we have been placing adequate lecture facilities at the top of every planning list for the past decade.

We have now moved out of Building 36 and have relocated to the far east side of campus in the modular village. We expect to remain here during the Building 36 rebuild. We have also

left, for good, our beloved yet humble “hovel” (aka the Earth Sciences Department Office) as it will be destroyed to make way for the expansion of the new Building 36. And so, like a few years ago, we find ourselves once again relocating to less-than-ideal facilities. However, we have had input into our spaces (lecture and office) for the remodeled Building 36. If all goes according to plan, we shall finally have state-of-the-art facilities for office, student support, and classroom spaces. We are very excited about the approved plans for the future new home of the Earth Sciences department in the rebuild of building 36 anticipated to be completed in 2021/2022.

- Create a link with an appropriate-level English composition course and Geography 130. Evaluate the level of student success as compared to Geography 130.

COMPLETED. A trial run was completed many moons ago and success rates were not improved. Subsequent linking to other disciplines (e.g., Communication and Counseling) yielded little success. As such, linking has not been aggressively attempted. Instead, we have introduced an online version of GEOG 130 which has been more successful in attracting a larger number of students.

- Collaboratively write student-learning outcomes and collectively agree upon their assessment methods to be written in course syllabi. Use student-learning outcome data for continued course and program improvement.

COMPLETED. This is an ongoing process.

- Using the Course History Information Report, continue to submit curriculum modification proposals for those courses that have not been reviewed by the Curriculum Committee in more than four years or curriculum deletion forms for those courses that have not been offered in the last three years.

COMPLETED. Currently all of our outdated course outlines are being updated. We have developed an “Associate of Science for Transfer Degree” (AS-T) for both Geography and Geology. As of March 2013 the proposed degrees were approved by the curriculum committee and were subsequently approved by the Board.

SECTION 2 - CURRICULUM DEVELOPMENT AND ACADEMIC STANDARDS

To answer these questions, refer to your department's catalog descriptions from the most recent college catalog (see “Courses of Instruction” section. This is the blue section).

If your program has an Associate Degree or Certificate program, refer to the relevant pages from the catalog (see “Associate Degree” section. This is the yellow section).

PURPOSE OF SECTION 2.1: To describe how curriculum is maintained and/or developed.

2.1 Describe how your course offerings have changed since the last program review. Have you added or deleted courses since the last review? If so, why? Include new or deleted programs, degrees and certificates.

As of the 2019-2020 Grossmont College catalog, the following courses are offered by the Earth Sciences Department.

GEOGRAPHY:

GEOG 100 Introduction to Global Studies
GEOG 101 Global Issues
GEOG 104 Introduction to Geographic Information Science (GIS)
GEOG 106 World Regional Geography
GEOG 120 Physical Geography: Earth Systems
GEOG 121 Physical Geography: Earth Systems Laboratory
GEOG 130 Human Geography: The Cultural Landscape
GEOG 140 Meteorology: Weather and Climate
GEOG 150 Field Study of the Natural History of the Greater San Diego Region
GEOG 170 The Geography of California
GEOG 172 Field Exploration: Colorado Plateau
GEOG 173 Field Exploration: Cascade Range / Modoc Plateau
GEOG 174 Field Exploration: Basin and Range Province
GEOG 175 Field Exploration: California Coastal Mountains
GEOG 176 Field Exploration: Sierra Nevada

GEOLOGY:

GEOL 104 Earth Science
GEOL 110 Planet Earth
GEOL 111 Planet Earth Laboratory
GEOL 121 Earth History
GEOL 150 Field Study of the Natural History of the Greater San Diego Region
GEOL 162 Geologic Field Studies: Southern California Mountain Regions
GEOL 163 Geologic Field Studies: Mojave Desert and Adjacent Areas
GEOL 164 Geologic Field Studies: Southern California Coastal Areas
GEOL 165 Geologic Field Studies: Colorado Desert/Salton Trough Area
GEOL 172 Field Exploration: Colorado Plateau
GEOL 173 Field Exploration: Cascade Range/Modoc Plateau
GEOL 174 Field Exploration: Basin and Range Province
GEOL 175 Field Exploration: California Coastal Mountains
GEOL 176 Field Exploration: Sierra Nevada
GEOL 210 Geology of California
GEOL 220 Geology of the National Parks
GEOL 230 Natural Disasters

OCEANOGRAPHY:

OCEA 112 Introduction to Oceanography

NEW “GLOBAL STUDIES” A.A.T. DEGREE! - Since the last program review, indeed some changes in course offerings have taken place! To take advantage of the State’s newly designed A.A.T. degree in Global Studies with a focus on globalization, and, anticipating a potential demand for this important topic, the Department developed and has recently added two new courses: GEOG 100 (Introduction to Global Studies) and GEOG 101 (Global Issues). These two courses were offered for the first time during the 2017-2018 academic year. For the time being, GEOG 100 is offered in the Fall semester only and GEOG 101 in the Spring. GEOG 100 is taught in an online format whereas GEOG 101 is presented in a traditional face-to-face format. At present, both courses have good enrollments, including students looking to satisfy their General Education Social Science requirement. Growth potential with these courses is tremendous as the topics covered are important and of interest to a wide range of students and the fact that this new transfer degree in Global Studies has been approved by the State beginning with the 2020-2021 academic year. The Department is planning on expanding the number of section offerings in both GEOG 100 and GEOG 101 once that transfer degree is available.

NEW MULTI-DISCIPLINARY CERTIFICATE OF ACHIEVEMENT IN DATA SCIENCES! – The Earth Sciences department worked collaboratively with the CSIS department and CTE/Workforce Development to create a new certificate of achievement in data sciences. As part of the required core, students will take Geography 104 (Introduction to Geographic Information Science – GIS) to develop skills in working with spatial data and generating data visualizations. This 5-course certificate will provide students with core skills, knowledge, and abilities to be able to work with data – store, analyze, organize, retrieve, and visualize. Because data-driven decision-making is essential in our modern technological world, providing students with a certificate of achievement in data sciences as a compliment to their degree or transfer pathway is a value-added opportunity for students. In addition, for students already in the workforce who need to develop currency, or learn the latest programming languages and data visualization software, the certificate provides a great opportunity as well.

ONLINE COURSES! - In addition to offering GEOG 100 online, the Department has begun to offer some of its traditional “bread and butter” courses in an online format. GEOG 130 (Human Geography: The Cultural Landscape), GEOG 120 (Physical Geography: Earth Systems), and GEOL 110 (Planet Earth) now have online options with two sections of GEOG 120 available. In addition, GEOG 104 continues to be offered in a successful hybrid format. Department members Cliffe and Therkalsen have put a tremendous amount of effort in the development of the online sections in order to produce quality, meaningful courses. These online courses are innovative, informative, and engaging—they are not simply modified versions of some canned, weak, and mediocre material put out by publishers. These courses also require proctored examinations either on or off campus as befitting a solid, meaningful college-level course. While the online option may be a convenience for some, others may be surprised as to the amount of rigor the classes demand—as one should expect from any college-level course—and so as with our face-to-face courses, instructors are available to assist and provide numerous resources to enable students to be successful. The converse has also been true; the Department has been able to tap into some outstanding students who would not otherwise have had access to our amazing courses! Enrollments have been good for our online courses; the instructors

are still working non-stop on the form of these courses; and the Department has been encouraged to offer more by the administration. This encouragement, while sometimes seemingly without concern for the type of quality and/or development of substantive interaction that is credible or even compliant with the ACCJC's recent Accreditation Report, has been given full attention. In fact, coursework continues to be developed by way of a Herculean effort to do so in an academically credible manner, requiring much greater effort than for standard on-campus classes.

COURSES REMOVED - Since the last review of our program, the Department has stopped offering any 199 (Special Studies/Projects) and 299 (Selected Topics) courses which previously were used as part of independent projects for individuals desiring the ability to study a topic within the Department's areas of emphasis for which no course existed.

THE NATURE OF COURSES - Problem solving, quantitative reasoning, and knowledge-based critical thinking are reinforced across the Department's curriculum. The Department makes a conscious effort to explicitly and deliberately link all phenomena and explanation to foundational theory in all delivery formats. This provides students a basis upon which to evaluate competing models and assumptions as they are encountered in future endeavors. The hallmark of the Department continues to be the stress placed upon college-level note taking abilities and, towards that end, our outlines have been updated to include the use of the latest technology at our disposal. Our courses consistently incorporate a reading and writing component through lab exercises, short answer exam questions, exam essays, projects, and papers. Through evaluations and mentoring, the Department makes every effort to monitor whether these skills and processes are also being integrated into sections taught by adjunct faculty. All courses are designed with equity in mind, providing opportunities for all students to be successful and engaged. For example, all courses in the Earth Sciences Department have been designated as zero-textbook-cost (ZTC) courses.

The Department long ago established and will continue to evaluate the learning outcomes to be accomplished by students in each course. The Department measures this progress in a variety of ways with an emphasis on exams as a mode of testing higher-level student conceptualization.

PURPOSE OF SECTION 2.2: To understand your practice for reviewing outlines. For example: under what circumstances you submit a new course, a modified course, or a course update to the curriculum committee.

2.2 Describe your department's practice for determining that all course outlines reflect currency in the field, relevance to student needs, and current teaching practices.

Older course outlines for the Department are periodically reviewed and updated as needed and when required (normally every six years). Modifications of late have generally involved some sections or courses moving from a traditional face-to-face format into either a hybrid or online method of delivery. The two previously mentioned courses (GEOG 100 and GEOG 101) reflect efforts by the Department in remaining committed to supplying relevant courses to meet student needs in an ever-changing world.

In order to ensure individual courses reflect currency in the field and are relevant to needs and teaching practices, the Department makes every effort to monitor whether necessary skills and

processes are being integrated into sections taught by all faculty. The Department long ago established and will continue to evaluate the learning outcomes to be accomplished by students in each course. The Department measures this progress in a variety of ways with an emphasis on exams in class (or on campus or proctored in the case of hybrid or online courses) as a means of testing higher-level student conceptualization.

Most members of the Department attend annual professional conferences as part of their attempts to stay abreast of developments within their respective fields. Some faculty members hold positions outside their teaching duties which provide them with real-world experience in the here and now. For example, Tim Cliffe works part-time for the United States Geological Survey and consistently shares with other Department members information or knowledge he has gained in that capacity. By staying on top of things, faculty are better informed and thus can generate and provide better quality lectures, labs, as well as advice to students considering careers within the various Earth Sciences fields.

PURPOSE OF SECTION 2.3: Explain how you incorporate new material in your courses on a semester-to-semester basis to maintain relevance and address current issues related to your discipline within the existing course outline.

2.3 How does your department use student engagement strategies in the classroom? How are your faculty including current issues in course content? Consider environmental, societal, ethical, political, technological, and/or other issues when answering this question.

The unique layout of the Earth Sciences Department current office allows for close interaction of faculty and staff practically on a daily basis. As such, communication is easy, frequent, and productive. In addition to pre-scheduled Department meetings, many impromptu meetings take place during which time faculty are able to discuss a variety of issues to include new research, current events, and what works best in terms of student engagement strategies across delivery modes (face-to-face, hybrid, and online). Innovations or methods adopted by one that yield good results are shared with all. For example, Tim Cliffe has somewhat revolutionized online lectures. Tim has spent innumerable hours in developing some of the highest quality, meaningful, and entertaining online lectures that exist within cyberspace. He freely shares his end products (i.e., online lectures) for all to review, learn, and incorporate methods into their own lectures. Students, of course, benefit the most as the online lectures do engage and educate them. More than once we have been told by students about how one of their friends or loved ones became interested in Tim's video lectures as the enrolled students were watching them which resulted in the friend/loved on watching the videos themselves even though they weren't in the class! (In other words, Tim's video lectures are engaging people beyond the classroom.) His video lectures are so good that Dean Cary Willard had Tim give a presentation at a Division meeting as to the quality that a distance education class can aspire.

Current issues and real-time data is incorporated as a foundation into all of our courses be they physical or cultural. Real-time data such as weather maps from the National Weather Service or maps detailing the latest earthquakes from the US Geological Survey are part and parcel of specific lectures. Current event issues such as oil prices, immigration, global pandemics, conflicts and war, water supplies, etc., are directly incorporated into course content both embedded within appropriate lectures and by assigning real-time out of class current event assignments that require analysis of those real-world issues that directly impact students, their communities, and nation.

Our GEOG 130 (Cultural Geography) course directly engages students by addressing and explaining ethnicity holistically and from a spatial perspective; this course should be promoted campus-wide as efforts for cultural competence become more important. However, students are increasingly told that cultural geography is not about cultural competence and for example, only courses such as cross-cultural studies can meet those specific needs. Our hope is to get more support from administration and counseling to ensure students understand that indeed cultural geography is a terrific and valid means to build cultural competency (in fact, illustrating this point, there are a number of Certificates of Proficiency which include this class). **The bottom line is that our courses are among the best on campus and we should be sent more students by the Counseling Department.**

Additionally, in order to better engage students, the Department's view is that it is important to know more about our students as individuals. To this end, most instructors have students fill out cards at the beginning of the semester to provide the instructor with some basic information such as what they consider to be their hometown, where they graduated from high school, what their major is, career goals, and the like. The information provided often serves as a conversation starter for the instructor in dealing with students one on one. Likewise, instructors inform students about their backgrounds, interests, and qualifications. The instructors make every effort to let students know how students can contact them and of the availability and importance of office hours and of the free tutoring, assistance, and resources available to them within the Department's common work area.

Engaging students is an ongoing process. Faculty work hard to remember names and faces as early in the semester as possible. We are constantly inviting students to come to the office common work space to study, relax, have a snack, meet the tutors, interact with other students, and of course, communicate with the instructors. As our Department members are very active on campus and in the community, we are constantly running into current and former students. We always communicate during those times, not because we have to but because we like to. Our students know we care about them as people and their success in school and life and this, we are certain, helps to retain some individuals.

An example of an attempt at engaging students in the classroom is what Mark Goodman does during his first week of lectures. Toward the end of the first lecture, Mark will place students in small groups and have the students introduce themselves to each other and then jointly work to answer a question from the lecture. A relevant PowerPoint slide is also displayed at this time. It is Mark's hope that by getting to know one another right away and working together, students will not perhaps feel isolated and therefore more likely to continue in the class, form study groups, and generally do better.

PURPOSE OF SECTION 2.4: To describe what the department does to maintain consistently high academic standards amongst its faculty.

2.4. What orientation do you give to new faculty (both full- and part-time), and how do you maintain dialogue within your department about curriculum and assessment? What strategies do you have in-place that ensure consistency in grading in multiple sections and across semesters (e.g., mastery level assessment, writing rubrics, and departmental determination of core areas which must be taught)? Consider department practices, academic standards, and curricular expectations (i.e. SLOs and teaching to course outlines)?

In Fall of 2019 the Department was able to hire our first full-time faculty member in over a decade—Anne Teachout. All full-time members of the Department are working with Anne to ensure she is comfortable in her position, knowledgeable of Department, campus, and district resources, able to effectively manage classrooms, and improving her content knowledge base. The physical

organization of the Department's office and common workspace along with the collaborative philosophy within the Department makes the mentoring process run smoothly. Part-time faculty members have access to the wealth of experience our long-serving full-time faculty members possess. The Department makes every effort to hire quality part-time faculty and to mentor them throughout their time with us. Our goal is to help adjunct faculty become better to the point where they can hopefully find employment full time (should that be their goal) at another college or university. While this ultimately results in our Department losing good adjunct faculty members, it is best for our disciplines, the system as a whole, students, and of course, the part-timer.

Dialogue takes place throughout each semester regarding curriculum and assessments. Sometimes this takes place within a scheduled Department or discipline meeting, at other times in an impromptu manner as situations arise. Again, the physical layout of the Department (current and planned) combined with a willingness to help and a presence (faculty spend many hours on campus and in the office), makes discussions and decision making generally easy to do. The Department's full-time faculty are in agreement as to what constitutes foundational core elements that need to be presented to students within our courses and these agreements have arisen over time as a result of careful consideration of a variety of factors. There is, of course, academic freedom on the part of the individual instructors but this works out (by choice) to be more in the area of organization, structure, and presentation as opposed to what is taught. That is to say, after a semester is over, students in all sections of a particular course will have generally been introduced to the same topics and concepts with some differences as to when a particular topic may have been introduced or the degree to which certain topics or concepts were emphasized based on an individual instructor's area of specialty or interest or experience. Course outlines and syllabi are adhered to and modified upon consensus should a change be required. SLO assessments are incorporated throughout the semester in the various courses. Analysis to date indicates success with some SLOs and not so much with others. As a result, SLOs continue to be reviewed and refined and/or rewritten after consultation by department members. This is an ongoing process that we are still monitoring and analyzing at the end of each semester.

PURPOSE OF SECTION 2.5: To gauge the overall patterns of student success, retention, and grade distributions across the course offerings in your department. Here the committee is looking for explanation on unusually generous or rigorous grading patterns.

2.5 Referring to the Grade Distribution Summary graphs (see Appendix 1), comment on how your department patterns relate to the college, division and statewide patterns. For course-by-course graphs, provide an explanation for any courses with different grade/success patterns than others. This may relate to major's courses vs GE, first-year vs second-year or basic skills vs transfer. Please describe how the department handles any unusual grading patterns. If you have any information that allows calibration of your grading data to external standards (performance of your students on standardized tests or licensing exams, transfer and/or employment success) please provide those to us and explain the connection. [The Program Review Data Liaison can help you with this section and will be providing you with all required data.]

Grades assigned to students at the end of the semester are, by law, at the discretion of the instructor. All faculty within the Earth Sciences Department spell out clearly grading criteria and rubrics at the beginning of each semester and for individual assignments throughout the semester. Department members have, within the recent past, embarked upon a path regarding grades and the changes that have taken place with the student population over the years. To that end, the Department has worked hard to provide students with additional help (e.g., extra handouts, online lectures that can be viewed

multiple times, accommodations for life issues that cause students to miss a lecture or exam, quality in-house tutoring, etc.) while continuing to maintaining high academic standards. Geography grade distributions over time, for example, are indicative of the positive results of these practices. The data shows that success rates have increased in the recent years and the number of “F’s” and withdrawals have decreased. Retention (as indicated by the decrease of withdrawals) has also markedly improved.

Geography Outcomes-by-Term show how the changes mentioned above have generated outcomes now very much in line with the Division, the College, and the State. For the Geography Course-by-Course graphs, GEOG 104 (Introduction to Geographic Information Science) tends to have one of the higher success rates. This is most likely due to the fact that this class is generally taken by individuals who are truly interested in learning the computer mapping and database analysis skills and abilities the course provides in order to obtain employment. Several of our former GEOG 104 students have moved on to internships or paid employment as a result of taking this class. With highly motivated students enrolled in the course and with its team-taught format which allows for a lot of student-instructor interaction, most students do very well (over 60% earning As and Bs). Grades of F in GEOG 104 are assigned to students who fail to turn in work and/or stop coming after the drop deadline.

GEOG 140 (Meteorology: Weather and Climate) is another course with generally motivated students as this class is taught in Spring only and is required for the major. As such, grades of A through C are similar to those earned in GEOG 104.

GEOG 106 (World Regional Geography) and GEOG 120 (Physical Geography: Earth Systems) while having success rates of around 50% (A, B, and C grades) are, however, the lowest. Withdrawal rates also tend to be a bit higher for these two courses compared to other Geography courses. These courses often times have people adding at the latest possible moment allowed by the college and we always try to accommodate by letting those late comers enroll. A general misconception many students have exists relative to the word Geography. Geography sounds easy—look at maps or memorize state capitals. The reality is that our Geography courses are solid social and physical science classes. While we work to provide students with the tools they need to be successful, students still must put in the effort and many are simply not prepared for a college-level course. For GEOG 106 and GEOG 120, what these two courses are is perhaps very different from student perceptions.

GEOG 121 (Physical Geography Lab), the non-required lab component to GEOG 120, has witnessed over time a substantial increase in success rates due to changes implemented by Cliffe and Goodman (and followed by our outstanding part-time instructor, Kristin Monteverde) as to how the course is run. Labs are now designed so that instructors and students systematically work through more material together. Additionally, extra credit work is offered. The extra credit offers students an opportunity to work on more problems applicable to specific labs outside of the lab setting. As the exams are open note, the extra credit provides an incentive for most students to continue to look over and revisit lab materials, have an opportunity to test themselves as far as subject mastery and, if they find themselves lacking, have enough time to get with the instructor or an Earth Sciences tutor in order to get up to speed prior to an exam. Students who take the lab class are also being exposed to concepts and topics again in lecture—sometimes the material is presented in lecture first, sometimes in lab. The bottom line is that students enrolled in lecture and lab consistently do better in both lecture and lab. If we could get more students taking the lab class, success rates in the lecture classes would likewise increase.

Geology outcomes show no definite, consistent pattern comparing fall to spring. Although there is great variability from year to year in outcomes (probably reflecting variability in adjunct staffing), a general increase in grades throughout the study period is seen. Several factors may contribute to these gains; 1) influence of the Counseling Department's highly successful GeoCon program; 2) tutors became more highly skilled; 3) curriculum changes that offered more opportunities for extra credit, less emphasis on tests and more on assignments; and 4) use of sabbatical-enhanced curriculum (e.g. PetraForge).

Except for fall 2017, overall Geology grades were consistently lower than state, college and division averages. The most likely explanation here is sampling bias. We do not get a representative sampling of students from the general population. Science majors are more likely to take chemistry or physics for their physical science G.E. requirements, while non-science majors are more likely to take Geology. The result is that we get students that are less proficient in science.

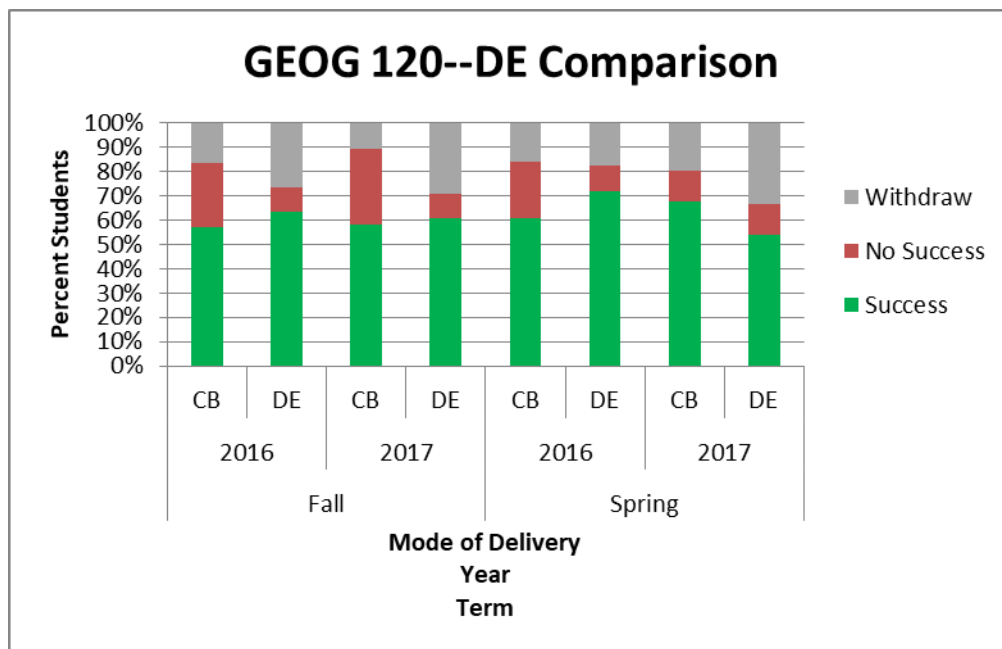
Success is notably better in Geology 104, 111 and 150 compared to Geology 110. Again, we are looking at sampling biases. Geology 104 is for teachers seeking a K-12 teaching credential. Such students are likely to be slightly more committed to succeeding compared with the general population. Only about 25% of Geology 110 students take Geology 111, and those that do not only get more individualized instruction, but significant reinforcement of the concepts learned in Geology 110. Students in Geology 150 and other geology field classes will generally have taken at least one science class prior to taking these classes, so they are likely to enter these courses with an advanced set of skills.

Like Geology, Oceanography outcomes show no consistent pattern comparing fall to spring and a general increase in grades across the period, but the gains are subtler for Oceanography. Like Geology, grades in Oceanography are consistently lower than state, college and division averages but even lower for Oceanography compared to geology. The same reasons why Geology students underperform relative to state, college and division averages apply to Oceanography, but to a greater degree due to a phenomenon that one might call the "dolphin factor". Oceanography attracts students that may associate it with marine biology and may not understand that it is a rigorous physical science that satisfies the same G.E. requirements as chemistry and physics. Oceanography students often don't know what they are getting into. Geology students do.

Oceanography outcomes by course mirror the same patterns as in Geology. Students enrolled in the oceanography lab do better than those in the lecture. They get more individualized attention and receive reinforcement of concepts learned in the lecture. Sampling bias may also be at work, because students who take the lab may be more committed towards fulfilling their G.E. requirements.

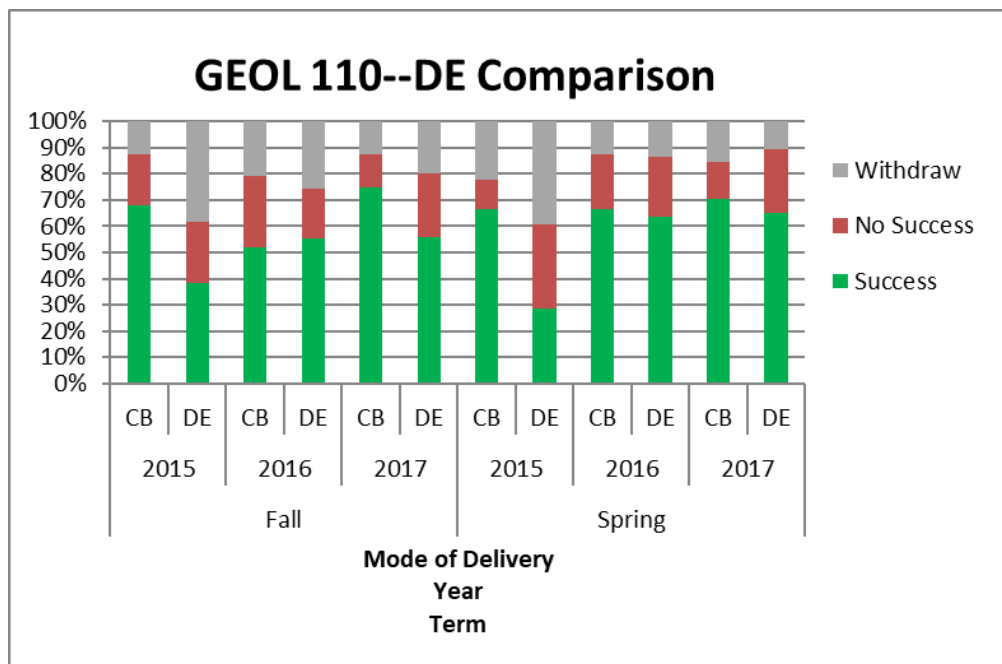
PURPOSE OF SECTION 2.6: To evaluate the department's success with course delivery methods in online vs. hybrid vs. face-to-face platforms.

2.6 If applicable, provide a comparison of the retention and success rates of distance education (online) sections (including hybrid) and face-to-face sections. What are your department policies on course delivery method? Is there anything in the data that would prompt your department to make changes? (Required data will be provided by the Program Review Data Liaison – insert graph here).



The data provided show that, with the exception of Spring 2017, GEOG 120 (of which two sections are offered) has slightly better success compared to traditional classroom lectures. As previously mentioned, a lot of time, energy, and effort has been put into developing these outstanding online courses by Tim Cliffe.

Within Geography, two additional courses have recently been offered in an online format: GEOG 100 (a new course) and GEOG 130. Data to compare success and retention for these courses has not yet been made available. However, anecdotally we have seen something interesting in the online GEOG 130 versus the traditional on-campus GEOG 130. It was our understanding when designing our online courses that they were supposed to provide an actual equivalent educational experience as our on-campus, fact-to-face courses. With this in mind identical exams were designed and used to assess both on-campus and online sections. Thus, Scott Therkalsen who taught both the on-campus and online sections of these courses, used the same exam to ensure all students enrolled were receiving the same education and held to the same standards. In order to do this, online students were required to come to campus to take the 3 exams since there is no other realistic way to ensure exams are completed honestly by the enrolled student. What is of great interest is that it appeared students in the online version outperformed students from the on-campus section. Therkalsen analyzed these results and designed his sabbatical in part to address these surprising results (e.g. weekly lecture quizzes are a required part of his online class, he has now been working on creating these sorts of quizzes for each of his other on-campus courses), more time will be needed to analyze the results.



GEOL 110 displays a different trend from that of GEOG 120 in that success rates in the online version are lower in all cases except one (Fall 2016). This single online course has been taught by adjunct faculty using “canned” material from publishers. The adjunct faculty member who taught the class for the time displayed in the graph has subsequently left Grossmont College. A replacement part-timer taught the course twice but did not meet the Department’s expected standards and have informed us they will no longer continue teaching the course. We have searched high and low and have found another adjunct instructor who began teaching the course in Spring 2020 and are optimistic the new instructor will do the course justice and provide students with the quality education they deserve. Beginning in the Summer of 2020 we have scheduled Chris Hill to teach GEOL 110 in an online format. Chris has a wealth of subject knowledge, is now semi-retired, and will have ample time to develop the course to its full potential. Thus, we fully expect to see improvements in the online section’s success rates.

2.7 If applicable, include the list of courses that have been formally articulated with high schools. Describe any articulation and/or curricular collaboration efforts with K-12 schools. (Contact the Dean of CTE if you have questions).

NA

PURPOSE OF SECTION 2.8: The committee wants to gauge if students are able to transfer successfully to four-year universities via your articulation agreements.

2.8 Please describe how the program ensures that articulations are current. Identify any areas concern or additional needs that your department has about articulation with four-year institutions.

The department strives to offer courses that will articulate with four-year institutions (especially SDSU) to ensure that students on a path towards transfer will be able to take our courses as part of their educational goals beyond Grossmont. For example: Chris Hill and Gary Jacobson met with the chair and faculty of the Geology department at SDSU and after discussing the

content of Grossmont’s GEOL 150 (Field Study of the Natural History of the Greater San Diego Region) course, SDSU now accepts GEOL 150 as fulfillment of their “Scientific Inquiry” requirement. Periodic review of curriculum is conducted to insure that articulation is maintained, including updating of course outlines. The department also works closely with Dee Aceves, Grossmont College’s articulation officer, along with the curriculum committee to ensure that any curriculum changes happening at 4-year institutions are reflected in our curriculum locally. A few years ago, Dee Aceves joined us at San Diego State University at a meeting with area community colleges.

The department recently developed a brand new transfer degree (“Global Studies”) along with two new courses that are part of that degree (“Global Studies” and “Global Issues”). We developed the courses based on approved C-ID course outlines, and verified that the degree was being offered in the CSU system. While SDSU does not currently offer a degree in Global Studies, we are collaborating with the Geography Department at SDSU in the potential development of a Global Studies degree at SDSU.

See Appendix 4.3 for additional specifics.

SECTION 3 – STUDENT LEARNING OUTCOMES (SLOs)

The SLO Cycle is summarized in figure 1 below.

**Figure 1
SLO CYCLE**



*Five-Step Assessment Process for Continuous Improvement
of Student Learning at Berea College*

PURPOSE OF SECTION 3: To show how SLO assessments are used to improve teaching strategies, develop curriculum, modify and/or update curriculum, and guide program planning.

3.1 Describe any changes (e.g., addition/deletion of SLOs, postponement of assessments) your department has made to your SLO assessment cycle. Include a brief description of why these changes were necessary. **NOTE: Changes should include reassessment of SLOs requiring further attention.**

SLOs continue to be assessed since we first thoughtfully crafted them. Last year we assessed 23 SLO's across 9 courses. We met our assessment targets for 17 of these SLO's but fell short in the remaining 6. The data cannot be disaggregated, so we are unable to note impacts on specific groups of students or because of differences in instructional modality.

3.2 Give examples of how your department/unit has used SLO assessment results to improve a course, course sequence, and/or program over this program review cycle. In your narrative, please pay particular attention to assessment of courses that directly lead to a certificate/degree/transfer (e.g., English 120, Psychology 120) and/or constitute a high enrollment course. For help with this prompt, please see the chart on the following page:

Examples of Changes that *May* be Implemented as a Result of Assessment

Changes to the Assessment Plan	<ul style="list-style-type: none"> • revision of intended learning outcomes • revision of measurement approaches • changes in data collection methods • changes in targets/standards
Changes to the Curriculum	<ul style="list-style-type: none"> • changes in teaching techniques • revision of prerequisites • revision of course sequence • revision of course content • addition of courses • deletion of courses
Changes to the Academic Process	<ul style="list-style-type: none"> • revision of advising standards or processes • improvements in technology • changes in faculty staffing • changes in frequency or scheduling of course offerings

Geology SLO's have been assessed in all multi-section courses and for courses that are offered every semester. This includes GEOL 104 (Earth Science), GEOL 110 (Planet Earth) and GEOL 111 (Planet Earth Lab). With a single exception (GEOL 164, Geology of Catalina Island), single section courses that are offered intermittently (once a year or once every two years) have not been assessed. One SLO exists for GEOL 104. We are happy to report that in Fall 2019, 75.3% gave a satisfactory explanation to the assessment question, which met our target goal of 70%. SLO's were assessed for GEOL 110 and 111 in Fall 2012, but that data was entered in an older version of TracDat and we have unfortunately lost the ability to recover that data to compare it against the last assessment of these courses made in Spring 2019 and

Fall 2018 respectively. We met 3 of 4 assessment targets for GEOL 110. For the single SLO that we fell short of the target assessment goal (relative age problems), we now direct students to an online exercise which helps improve this skill. In GEOL 111, 5 of 6 target assessment goals were met. The only outcome that came up short was measuring/plotting strike and dip. We decided to eliminate certain exercises (faults in block diagrams) to provide more time for activities that would assure that the target assessment goal was met.

All other Geology courses are field classes, except for GEOL 121 (Earth History), which is required for Geology majors. Students who enroll in GEOL 121 and our field classes are generally our best and brightest and teacher-student interaction in these courses is very high. Although we have not formally assessed and reported SLO's for these courses in TracDat, the consensus of our faculty is that the associated SLO's are being met.

Oceanography SLO's have been assessed twice for OCEA 112 (Introduction to Oceanography), which is the course which accounts for the overwhelming majority of oceanography enrollment. OCEA 112 was assessed in fall 2012 and again in fall 2018. Because only 1 of our SLO's met the target assessment goal in 2012, actions were taken to improve outcomes; including rewording of test questions, spending more class time on associated topics and revising lecture emphasis and structure. Results were mixed, but generally positive. Assessments for 3 of our five OCEA 112 SLO's improved in 2018, one got worse, and one remained virtually unchanged. Additional actions were taken in 2018 to continue to improve OCEA 112 SLO assessment outcomes including SLO-specific training for our tutors and developing SLO-specific assignments.

Prompted by the writing of this program review document, OCEA 113 (Oceanography Lab) SLO's were assessed for the first time in fall 2019. The three SLO's for OCEA 113 were assessed by aggregating the results from several lab reports whose content most closely corresponded to individual SLO's. By and large, we meet our target assessment goals. For the 2 labs that fell short, it was decided that embedding a tutor in those labs would do much to improve student performance. We are testing this method for the first time in Spring 2020.

The remaining Oceanography course, OCEA 150 (like GEOL 150 and GEOG 150), is a team-taught field class. The primary assessment tool for these courses is a semester project (notebook), while a final exam serves as a secondary assessment. Close collaboration between the instructors in these classes, combined with consistently high-performing students, results in near-unanimous achievement of SLO's in these classes. As such, we see no benefit in reporting our SLO assessments for these courses.

3.3 What resources (time, professional development, curriculum approval process, etc.) did you need to carry out these improvements? Please explain.

The Earth Science Department has decided to meet during Flex Week to discuss SLO's in order to ensure that issues are addressed and corrected, and that processes are updated, if needed, on a semesterly basis. Ideas generated as a result of such meetings include things like ensuring a continuation of quality in-house tutoring and to have tutor support during lab hours, expand in-house made video tutorials, and develop more innovative and engaging computer applications.

3.4 What evidence did you collect to demonstrate that the planned improvements were successful? If you have yet to assess the improvements, what evidence do you plan to collect?

Because most early SLO assessment data was entered in a version of TracDat that cannot be recovered, corresponding plans for improvement were also lost, and we have no way to tell if most planned improvements were successful. OCEA 112 data is the exception. It was accessed in 2012 (and the data survived) and again in 2018. We used the same tools (comprehensive questions on the final exam) both years to assess the SLO's and compared the average student success rate on those questions to demonstrate that the planned improvements were successful. We realize now that six years is too long to reassess SLO's whose targets were not met and plan that all future unmet SLO targets will be reassessed within one year.

3.5 How will you use this evidence to ensure ongoing course/course sequence/program improvements are sustained?

If SLO assessment targets are not met in individual courses, then we will consider one or more of the following strategies to improve our student learning outcomes:

- Restructuring our teaching and learning methods to promote active learning
- Taking a more active role in assessing our students' potential for learning
- Meeting on a regular basis to discuss and reflect on the department's progress toward meeting our student learning outcomes
- Using student, peer and manager evaluations to help determine the most appropriate course of action

The sustainability of any or all of the above actions largely depends on their success. If instructors see improvements in student learning outcomes as a result of these measures, they will be motivated to continue to work towards improving SLO's.

Sustaining improvements in our course sequencing is a non-issue, because Earth Sciences courses do not need to be taken in sequence. Our courses are largely designed to fulfill physical and social science GE requirements and, for the most part, do not have prerequisites. Our labs (GEOG 121, GEOL 110 and OCEA 113) are somewhat of an exception. Although for each lab, the corresponding lecture is a pre- or co-requisite, our labs have been designed to function more-or-less independently of the lecture. This has been done to give lecture instructors the academic freedom to follow a sequence of topics that works best for them. GEOG/GEOL/OCEA 150 do have a prerequisite, but it is only that students have fulfilled their GE physical or life science requirement which includes a wide variety of courses.

Regarding program improvement, the department has mapped our PSLO's to GE competencies and is currently working to assess our PSLO's by mapping our PSLO's to corresponding course SLO's. Alternately, or in conjunction, the department will use the final exam in our capstone course, GEOG/GEOL/OCEA 150, to reflect holistic evidence of all the PSLO's

SECTION 4 - FACILITIES AND SCHEDULING

PURPOSE OF SECTION 4.1 – 4.4: To determine how departments utilize various campus services and the impact on student access (consider facilities, scheduling, campus resources and technology).

- 4.1 List the type of facility spaces your department/program utilizes for instruction. This can include on-campus, off-campus, and virtual.

The Earth Sciences Department offers some courses on campus in the still valid and important traditional face-to-face setting, some off campus in the form of field courses, and some online (with required on-campus or proctored exams), and some in a hybrid format (e.g., GEOG 104: Introduction to Geographic Information Science).

The Department also stresses the use of a communal space in the office where students can gather, interact, work, and access information and instruction from both tutors and instructors. This space is a very valuable resource, one of which we are constantly reminding students to take advantage.

- 4.2 Are the spaces listed in 4.1 adequate to meet the program's educational objectives?
Yes ___ No X

- If you checked 'yes', please explain how your department/program utilizes facility space so your department can meet its educational objectives. Please provide an explanation of specific facility requirements of your program, and how those requirements are being met.
- If you checked 'no', please explain how your department/program is not meeting its facility space needs to adequately meet its educational objectives. Please provide an explanation of specific facility requirements of your program, and how those requirements are not being met.

The Earth Sciences Department has for many years been operating in temporary classroom facilities due to the destruction of old classrooms (the former 300 West building) to make way for various construction projects (e.g., Building 34—Health and Sciences Complex) across campus. Operating in temporary spaces is scheduled to continue into the near future as the Department's office and work space (Building 37) will be destroyed. Additionally, our temporary classrooms in Building 36 will be unavailable for some time as that structure undergoes a major remodel.

Traditional lecture style classrooms with adequate space for specimens, maps, etc., with clear lines of sight to visualizations (e.g. tiered classrooms) which are at the core of learning concepts within the Earth Sciences and supporting the development of spatial literacy are required. Additionally, high quality data projectors to maximize such things as remotely sensed imagery, cartographic symbology, etc. are required in order to convey clearly concepts and principles. As board work is integral to our lectures, lots of whiteboard space is also needed.

As of the time of this writing, most of the things listed above are either absent from our present lecture spaces or less than optimal. Teaching geography, for example, in a classroom without

a series of large-scale maps one can consult in conjunction with whiteboard work and computer displays (which don't often work due to IT issues beyond our control or the horrible lighting that washes out finer yet important details) gives an impression of a lack of professionalism, is embarrassing, and does not serve students well.

As mentioned earlier, students are negatively impacted as what we know we need and they need in terms of classrooms and offices have yet to be met. Members of the Department are united in requiring students to be active note takers. It is difficult for students to take notes when they cannot easily see what the instructor wrote or diagrammed on the whiteboard because of visual obstructions (like a Smart-cart being in the way). Distance is another factor. In some of the new temporary classrooms, whiteboard space exists without blockage for one side of the class but if used, is too far away from the other side of the class to see easily. The instructor shouldn't have to duplicate information on opposite sides of the room and the students shouldn't be unfairly punished by what side of the classroom they sit.

Lighting continues to be a problem. For some reason, lights dimmed in the new lecture spaces make almost no difference in the quality of visual materials displayed on the screens through the data projectors. Of course, there is always a light that will not dim directly in front of the projection screen. Again, we rely heavily on visual aids to help our students understand concepts and topics. Instructors put in many hours creating the right image and text to display only to end up often showing a washed-out version that has to be explained with comments to students such as..."Well, if you look closely you can kind of see..."

- 4.3 What proactive steps have you taken with regards to facility and scheduling to improve the ability of your department to meet the educational objectives of your program and ensure that students can complete their program in a timely manner?

Regarding facilities, we attempted to make the best of our long-term temporary classrooms in Building 36 but have now moved away from even those spaces. As a result of working with administration and classified staff we were able to obtain the installation of data projectors that are of a better quality in terms of display—vitaly important given the visual nature of much of what we teach. A raised platform/stage was installed in the front of Room 355 in order to improve visual access from the back of the room. The stage was connected to the rest of the room through an ADA-compliant ramp. An electronic map wall was installed with the intent of providing real-time data for such things as Meteorology. Computers were installed in Building 30, Room 208 for use in the GIS class and for lab use. This installation required custom cabinetry which was handled deftly by staff at Grossmont College. Prior to the computers being available in Room 208, the GIS class languished in the common open space tutoring area on the second floor of Building 30. Such a location was less than ideal (terrible, in fact) in that for a lecture/lab class area it was loud and often crowded and on occasions we had to displace other students who were studying other subjects. We actually got to the point where we had to set up traffic cones to block pedestrian traffic from moving through our lecture/lab space. We have been involved in the planning of our new spaces in the remodeled Building 36 and expect our needs to be met when that construction is completed. Prop V funds have been used in addressing our needs with the "new" building.

We have recently moved into the temporary spaces available in the 100's complex. Unfortunately, we were unable to secure even the barely acceptable conditions that we had in our other temporary spaces in Building 36. For instance, we requested that large student

tables (such as those we had in room 36-355) be kept (as they were already there) in our new classroom 100-109, which enables students to work with maps and take notes. Unfortunately, this requirement was not completed as requested and previously agreed upon. Furthermore, the request for a stage in our new large classroom to replicate what was in our old classroom was denied without discussion. And, all the Smart-carts have been placed directly front and center of the whiteboards; we have repeatedly explained at every stage of planning that this is a huge impediment for instructors to actually use the whiteboards and for students to be able to view the information and diagrams on the board in order to incorporate them into their notes. At this point in time nothing has been done to rectify the situation. Some students rise out of their seats to see everything the instructor puts on the board because of the Smart-cart creating a visual obstacle. The Smart-carts also have large, thick cables running on the floor which instructors have tripped over numerous times. We are hoping that classroom requirements we discussed as part of the Building 36 remodel will materialize as planned. However, because instructional and department design is what we consider the most important structural tool for student success, we would ask that one of our recommendations from Program Review be that administration ensures that the hard work all members went through to create the best possible instructional and department spaces be valued by ensuring that all facilities materialize according to previously agreed upon plans.

- 4.4 Identify and explain additional needed technological and equipment resources that could further enhance student learning in these spaces.

Proper space for the GIS course (GEOG 104, Introduction to Geographic Information Science) would be even more helpful than the sharing of space within the Earth Sciences Lab area. At present the course is taught in a shared lab. The long-awaited and request for dedicated GIS space is coming to fruition as a result of collaboration with the Department of Administration of Justice. As of Spring 2020, this will be resolved.

PURPOSE OF SECTION 4.5: To have departments determine, based on their review of waitlist data and student feedback, if their program could serve more students if it had more facility resources available and/or used them differently.

- 4.5 Are students trying to access your program impacted by the facility spaces listed in 4.1?
Yes ___ No X

- If you checked 'yes', please explain how students are being negatively impacted by unmet facility needs experienced in your department/program. Please provide some specific examples.
- If you checked 'no', please explain how your department/program is actively managing its facility space needs to meet its educational objectives and provide student access to your program. Please provide some specific examples.

There do not seem to be any impediments to students attempting to enroll in our classes other than the web-based college course information and enrollment pages and process is not user friendly. We are certain that if a friendlier online registration system was in place we would garner a few more students.

We would hope that the Counseling Department send more students our way as we have worked hard to provide students with ZTC courses, hired quality in-house tutors, and

redesigned courses to help students become more successful instead of redirecting them away from our classes for fear of lowering their GPA.

4.6 If applicable, please include any additional information you feel is important regarding facilities and scheduling that was not included above including non-classroom spaces such as offices, storage, preparation areas, open workspaces for students/tutoring, etc.

It is imperative that we have sufficient and proper spaces dedicated to the storage of laboratory and field equipment. Additionally, the department needs open workspaces for students and tutoring. Our current arrangement allows for ease of interaction between faculty, staff, students, and tutors and helps to facilitate retention and success. Included in our current work space we have a small Department library with numerous books and texts which students are free to use while remaining in the office. This replaces largely our former practice of placing textbooks in the library as most of those materials ended up being vandalized or stolen. By having resources available within the Department for student review, no such issues have arisen and it provides further opportunities for interaction and improvements in retention and success.

SECTION 5 – STUDENT EQUITY AND SUCCESS

PURPOSE OF SECTION 5:

- To determine if student enrollment in your program is robust and if students are enrolling in your program in equal representation to the general Grossmont student population.
- To have the department examine student success and retention overall for your department and disaggregated by ethnicity, age, gender.
- To have departments explain what they have done to improve success for all students while maintaining academic rigor.
-

NOTE: See Appendix 2 for enrollment data; Appendix 3 for student success data.

5.1 What are the identifiable patterns with regards to overall trends in enrollments in your department? Explain what is causing these trends (e.g. campus conditions, department practices). Once you have identified and explained your enrollment patterns, then address what your department has done/is doing to address identified issues. Examples of any changes you made to manage enrollment are encouraged.

In addition, you should examine your enrollment data, disaggregated by gender, age and ethnicity. For any of these student groups in your department with enrollment data at lower or higher proportions than college-wide numbers, describe what factors you think is causing these patterns.

Although college enrollment steadily declines across the period graphed, Geography, Geology and Oceanography all show steeper declines in enrollment at the beginning of the period, but

then show signs of stabilization towards the end of the period. The steep initial enrollment declines for the Department enrollment may, in part, have been caused by state efforts to cut costs by encouraging students to follow recommended course pathways, thereby reducing the number of students enrolling in self-selected, exploratory courses such as those offered in the Earth Sciences. Enrollment declines motivated the Department to make several changes that appear to have stabilized enrollment. The most important of these include: 1) working closely with counseling to engage our students via the GeoCon program; 2) adopting a department-wide Zero Textbook Cost (ZTC) policy; and 3) increasing in the number of online courses taught. It is not clear what role section cuts may have had, if any, in stabilizing enrollments.

Enrollment trends by gender for the Department largely mimic those for the college but with subtle differences. Geography and Geology have a slightly higher percentage of females relative the college average. Often, our top students have been females. This has allowed us to hire some outstanding female tutors and provide support for those pursuing internships and jobs.

A possible explanation as to the larger number of females is that both disciplines offer courses that are specifically required for K-5 teaching credentials. Traditionally, more females have pursued careers in K-5 teaching than males. Most of the female students enrolled in GEOG 106, for example, have indicated (from questionnaires) that they are planning to pursue a career as an elementary school teacher and this is generally not the case for male students. This premise is also backed-up by the fact that Oceanography, which does not offer courses specifically required for a K-5 teaching credential, does not have higher female/male ratios than the college average. Female/male ratios in Oceanography are slightly lower than the college average—a fact that may indicate that males may be more likely to participate in ocean activities (e.g. surfing, paddle sports, fishing, diving, etc.).

Enrollment trends by age vary by discipline. While both Geography and Geology show a general aging of our students, geology's decline in % students age 19 or less is more pronounced. Possible explanations include 1) increased emphasis on "high-tech" disciplines (e.g. information technology and biotech); 2) students have limited, if any exposure to geography and especially Geology in high school; 3) younger students are increasingly being counseled into taking chemistry or physics rather than the Earth Sciences; 4) increased urbanization limits exposure to Geology; 5) increased awareness of climate change may decrease interest in Geology if students associate Geology with the oil and gas industry.

Oceanography's enrollment by age patterns are more complicated. We see no obvious trend over time for students age 19 or less, but this demographic is significantly higher for Oceanography than the college average and even higher (+15%) than in Geography and Geology. Oceanography may be attracting a disproportionate percentage of young students because of increased student awareness of environmental issues (e.g. climate change). Students probably see oceanography as an environmental science more so than they do Geography and Geology. Those in the age range of 20 to 24 make up about the same percent of Oceanography students as they do the overall college population, but their percent of total Oceanography enrollment seems to be increasing. Older students (25+) enroll in Oceanography at rates 2-5% less than college averages, presumably because these groups are focused on taking classes more relevant to their career.

Like age, enrollment trends by ethnicity vary by discipline. Comparing Hispanic & White enrollment, Geography, shows no discernable trend; Geology may show a trend towards

increasing White enrollments; while Oceanography is the only discipline which mimics the college trend towards increasing Hispanic / decreasing White enrollment across the period. These trends are influenced by the enrollment by age patterns which show that young students disproportionately take Oceanography over Geography or Geology. Younger students are increasingly Hispanic.

While Asian and Filipino enrollments are similar to college averages and show no consistent trends over time, enrollment is significantly lower (by % students) in Geology and Oceanography for these groups. These students may be more likely to take chemistry and/or physics rather than the exploratory sciences we offer in the Earth Sciences.

The sample size for the remaining ethnic groups is probably too small to make meaningful conclusions. American Indian/Alaskan Native and Pacific Islander enrollment data shows no significant trends over the period for geography, geology and oceanography nor significant differences with college averages. Enrollment percentages for Black and Two+ ethnic groups are erratic for both Geography and Oceanography but are broadly similar to the college average. Compared to college averages, Black and Two+ ethnic groups make up a greater percentage of students in Geology classes at the beginning of the period, but both ethnicities decline to below college averages late in the period. Again, due to the relatively small size, we are unwilling to speculate as to why.

5.2 Discuss trends in student success and retention overall in your department and explain these trends (e.g. campus conditions, department practices). Also examine the success and retention data disaggregated by gender, age and ethnicity. For any groups that have success rates in your department at lower or higher than college-wide describe what factors you think cause those patterns. Provide examples of any changes you made to improve student success/retention, especially for groups that have equity gaps. [Data and a summary of notable patterns will be provided by the Program Review Data Liaison]

Geology outcomes show no consistent pattern comparing fall to spring. Although there is great variability from year to year in outcomes (probably reflecting variability in adjunct staffing), we see a general increase in grades throughout the period. Several factors may contribute to these gains; 1) influence of GeoCon; 2) tutors became more highly skilled; 3) curriculum changes that offered more opportunities for extra credit, less emphasis on tests and more on assignments; and 4) use of sabbatical-enhanced curriculum (e.g. PetraForge).

Except for fall 2017, overall Geology grades were consistently lower than state, college and division averages. The most likely explanation here is sampling bias. We do not get a representative sampling of students from the general population. Science majors are more likely to take chemistry or physics for their physical science G.E. requirements, while non-science majors are more likely to take Geology. The result is that we get students that are less proficient in science.

Success is notably better in Geology 104, 111 and 150 compared to Geology 110. Again we are looking at sampling biases. Geology 104 is for teachers seeking a K-12 teaching credential. Such students are likely to be slightly more committed to succeeding compared with the general population. Only about 25% of Geology 110 students take Geology 111, and those that do not only get more individualized instruction, but significant reinforcement of the concepts learned in Geology 110. Students in Geology 150 and other geology field classes will

generally have taken at least one science class prior to taking these classes, so they are likely to enter these courses with an advanced set of skills.

Like Geology, Oceanography outcomes show no consistent pattern comparing fall to spring and a general increase in grades across the period, but the gains are more subtle for oceanography. Like Geology, grades in Oceanography are consistently lower than state, college and division averages but even lower for Oceanography compared to Geology. The same reasons why Geology students underperform relative to state, college and division averages apply to Oceanography, but to a greater degree due to a phenomenon that one might call the “dolphin factor”. Oceanography attracts students that may associate it with marine biology and may not understand that it is a rigorous physical science that satisfies the same G.E. requirements as chemistry and physics. Oceanography students often don’t know what they are getting into. Geology students do.

Oceanography outcomes by course mirror the same patterns as in Geology. Students enrolled in the oceanography lab do better than those in the lecture. They get more individualized attention and receive reinforcement of concepts learned in the lecture. Sampling bias may also be at work, because students who take the lab may be more committed towards fulfilling their G.E. requirements.

5.3 Describe specific examples of departmental or individual efforts, including instructional innovations and/or special projects, aimed at encouraging students to become actively engaged in the learning process in their classes.

Gary Jacobson’s sabbatical project (“PetraForge”) in fall 2015 aimed to improve student success in classifying rocks and in explaining how rock-forming processes determine rock properties by developing computer-based, exploration-driven learning modules for each of the three rock families. Each module prompts students to select rocks from a collection and then challenges them attempt to “make” the rock by choosing from an evolving set of geological processes which affect earth materials on their way to becoming rocks. Through sequential graphics and animations, students see the result of their choices on both macro and microscopic scales and strengthen their grasp of cause and effect relationships. The project filled the need for meaningful and engaging assignments and helped diversify the criteria for success in Geology 110.

The department is committed to providing field experiences to as many students as possible. We do this by offering: 1) a broad spectrum of field classes; 2) instructor-led field trips in our regular (non-field) classes both during and outside of scheduled class times; and 3) self-guided field experiences that students can do whenever their schedule permits.

In an attempt to integrate one of the most important technologies within the field of Geography part of Scott Therkalsen’s sabbatical project involved the integration of Geographic Information Systems (GIS) into Geography general education classes. Geographic Information Sciences is the most employable field of Geography and is one of the most engaging educational practices students can participate in (GIS involves personally turning data into maps to illustrate specific points of emphasis). By requiring assignment (or at least providing the opportunity for extra credit) that teach students to use basic GIS to illustrate important class concepts the hope is that this will actively engage students in their own learning outcomes as well as open their eyes to this exploding useful and sought-after field of technology.

Tim Cliffe has massively increased the use of CANVAS for on-campus students, providing

ancillary instructional resources, practice quizzes, and newly-developed assignments meant to take advantage of the widespread availability of smartphones, wifi coverage, and highly edited lecture presentations via software such as Camtasia. So much so that in some units, he has adopted a “flipped classroom” approach, using in-class time to work on group review and group assessment of material presented in Canvas. This has meant that numerous additional in-class quiz opportunities have been developed to maximize student interaction and engagement with lecture material and student notes. This has been done, in part, by greatly expanding the usage of Teaching Assistants (TAs) to keep up with the greatly increased faculty workload. The use of peer-tutors has also been greatly increased, including even into lecture and labs to directly connect students with tutors, and to be available during lab projects.

Tim has also become very involved in running an academically grounded Instagram site for the department.

5.4 Explain how the program incorporates opportunities for student engagement outside of class time and/or in collaboration with other departments (e.g. interdisciplinary course offerings, learning communities, internships, research projects, service learning, or participation in community events, tournaments, competitions, and fairs) to enhance student learning.

The faculty are greatly involved in discipline and college related activities across the campus, and across the community.

Tim Cliffe shared an Innovation Award at Grossmont College several years ago associated with the “Educational Landscape Zones” across campus. He has thus been the lecturer for the Student Give Back day here on-campus each year before students go out across campus under the auspices of the college grounds crew. Tim has also been involved in Teacher Training for the Sweetwater District for the new high school Earth Science standards applied to Biology, Chemistry, and Physics courses. He’s also involved in hydrology labs in the Civil Engineering Department at SDSU, and has mentored numerous students into positions locally in hydrology and biogeography.

Tim has spent time with other individual classes from area high schools and junior highs, for example see the following email.

Professor Cliffe,

Our students (and teachers) are so excited about having you come talk to us on Monday, December 16. We have your talk scheduled at 10:45-11:30AM. We are currently scheduled to use the outdoor amphitheater; however, we noticed that there is no sound system outside and there is a water feature which is quite noisy. We can move to the indoor theater if you would like or we can work on getting some type of sound system for outside. We hope you can give us an overview of the geology of Mission Trails and then allow some time for the kids to ask questions. I can send you a list of questions if that would be helpful to you. Please let me know if you would like the questions ahead of time.

Here are the 7th grade Earth Science Standards we have been working with for the last few weeks:

* *All Earth processes are the result of energy flowing and matter cycling within and among the planet's systems. This energy is derived from the sun and Earth's hot interior. The energy that flows and matter that cycles produce chemical and physical changes in Earth's materials and living organisms. (MS-ESS2-1)*

* *Water's movements—both on the land and underground—cause weathering and erosion, which change the land's surface features and create underground formations. (MS-ESS2-2)*

* *The planet's systems interact over scales that range from microscopic to global in size, and they operate over fractions of a second to billions of years. These interactions have shaped Earth's history and will determine its future. (MS-ESS2-2)*

* *Tectonic processes continually generate new ocean sea floor at ridges and destroy old sea floor at trenches. (HS.ESS1.C GBE) (secondary to MS-ESS2-3)*

* *Maps of ancient land and water patterns, based on investigations of rocks and fossils, make clear how Earth's plates have moved great distances, collided, and spread apart. (MS-ESS2-3)*

* *Humans depend on Earth's land, ocean, atmosphere, and biosphere for many different resources. Minerals, fresh water, and biosphere resources are limited, and many are not renewable or replaceable over human lifetimes. These resources are distributed unevenly around the planet as a result of past geologic processes. (MS-ESS3-1)*

* *Mapping the history of natural hazards in a region, combined with an understanding of related geologic forces can help forecast the locations and likelihoods of future events. (MS-ESS3-2)*

Thank you again for your time and support of our students in their quest to learn about the geology of Mission Trails. Please do not hesitate to contact me if you have any questions, comments, or concerns.

*Olivia Allison
7th grade Science Teacher
Lewis Middle School*

Tim's focus on students was acknowledged statewide by being awarded the 2018 "Friend of Geography" by the California Geographic Society. This statewide honor was initiated by our past student Avary Rollins, recently hired by the San Dieguito River Park in North County.

Tim has also been asked by the Los Angeles National Weather Service office to speak on a panel with several Los Angeles community college Physical Geography instructors and along with his former Meteorology student and now Senior NWS Forecaster Todd Hall at the September 2020 Annual Meeting of the National Weather Association in Tulsa, Oklahoma. See the announcement below.

Collaboration of Southern California Colleges and Universities to Establish a Weather-Ready Nation

Todd Hall, NWS Los Angeles; Tim Cliffe, Grossmont College; Jing Liu, Santa Monica College; Steve LaDochy, Cal State University Los Angeles; William Selby, Santa

Monica College; Jodi Titus, Irvine Valley College; Craig Webb; Mt. San Antonio College

Generating partnerships is critical to communicating the science of meteorology, understanding climate, and getting people to act before and during a major weather event. The National Weather Service Los Angeles' office in Oxnard, California is currently working with local colleges and universities to enhance and support the instruction and research in higher education to foster improved weather and climate literacy. Working with 29 professors at 19 different academic institutions, this partnership serves to accomplish a Weather-Ready Nation for the National Weather Service, while giving professors and instructors of weather and climate courses in California vivid and real-life experiences, in-depth understanding, and cutting edge technology from meteorologists and weather forecasters to thereby enhance student learning objectives and involvement. This presentation and panel discussion by the National Weather Service and representatives from several different colleges and universities throughout southern California, will not only showcase how the National Weather Service is engaging the academic community, but how the academic community is leveraging the partnership to increase the understanding of the science of weather to better benefit their faculty, student bodies, and respective institutions. Through the main goals of collaborative education, professional development, student research, and career pathways, we hope to create and maintain a regional collaboration for the exchange of ideas and experiences to expand the use of the scientific method, promote STEM related career potential, and increase the knowledge of weather and climate both inside and outside of the classroom.

Mark Goodman has taken his experiences and off-campus positions within the veteran and military community as an opportunity to connect with student veterans. As the former 1st Vice Commander and currently the Commander of American Legion Post 303 in El Cajon, Mark has gotten student veterans interested in participating in the annual Chula Vista Veterans Walk to raise money for the Chula Vista Veterans Home. Mark has participated as well and the walk affords an opportunity to talk to and connect with a segment of our student population that often times feels somewhat isolated.

Judd has, for several years, mentored former GEOG 104 (Introduction to Geographic Information Science) students as they turned their classroom final projects into award-winning GIS posters at the annual meetings of the California Geographic Society. Some awards have included monetary prizes—always appreciated by students. Of note is the fact that our students have won awards with just a single GIS course under their belt which means they have often beat out other students who have taken more GIS courses. Judd has also encouraged and has taken some former GIS students to attend the important GIS-industry conference, put on by GIS industry leader, ESRI, here in San Diego.

- 5.5** If state or federal licensing/registration examinations govern the program, please provide data and comment on student success trends.

No state or federal licensing/registration examinations govern the programs within the Earth Sciences Department and thus, not applicable.

- 5.6** If your program offers a degree or certificate in the college catalog, explain the trends regarding number of students who earn these degrees and/or certificates, including any changes that you have made to increase awards. Insert the “Degrees and Certificates” data table in this section.

The relatively small number of degrees in Geology and Oceanography reflects the fact that the vast majority of our students take those courses to satisfy the General Education physical science requirement. They are typically not science majors. Although the number of degrees awarded in Geology and Oceanography is too small to show any significant trends over time, we do see a significant increase in the number of Geography AA-T degrees beginning in 2015/2016, which probably reflects the efforts of the “Geocon” program.

We have also created new Certificates of Proficiency and Achievement. For example, our Data Science Certificate of Achievement is interdisciplinary and addresses the increasing need globally to work with large volumes of data spatially. In response to community desire to have concrete proof of the proficiency with which students leave our Geographic Information Sciences class we also created a GIS Certificate of Proficiency. These certificates are only this semester becoming official so no useful data is available at this point.

5.7 If you have any information on what students who major in your department go on to achieve after they leave Grossmont, please share that with us. For example, where do they transfer and do they graduate on time? What careers do they pursue? What are starting salaries in the field? Do you know if they go on to employment in their field and professional success? What impact did Grossmont have on their lives?

There have been numerous student success stories within the Earth Sciences Department. Most of our students eventually go on to transfer to SDSU. However, we’ve had students transfer to other institutions within the CSU and UC system as well as out-of-state. More often than not, our students who transfer to SDSU tend to excel once there and several have been the top student within the SDSU Geography Department.

Several former students have gone on to find gainful employment within fields related to Earth Sciences. Some of our former students and graduates include:

Avary Rollins who works as a Park Ranger for the San Dieguito River Park
Marwan Akram is a GIS Technician with the County of San Diego
Colby Stetz—also working in GIS for the County of San Diego
Megan Stanulis is employed with the US Geological Survey
Jeff Kitchen is Head of Surface Water in California at the CA Water Science Center (USGS)
Kristin Monteverde is a former student who is now teaching for us part time
Sara Jones, Sean Pepin, and D. J. Martin also work for the USGS
Ryan Robertson is a Head Ranger at Mission Trails Regional Park and Stacey Miller works there as a docent
Cassandra Vandyne teaches at the Cuyamaca Outdoor School at Cuyamaca Rancho State Park
Tom Petty (no, not the singer) interns at the City of Santee working with stormwater
McKenna Kull works as an Environmental Sustainment Specialist with SDG&E
Todd Hall is a Senior National Weather Service Forecaster

As the positions above vary, so do salaries. In Fall 2019 we had two students hired in the field of GIS (Geographic Information Systems/Science); one for the City of San Diego and one for the County of San Diego. Starting salaries were around \$50,000 per year.

Very recent examples of some spectacular students include Carmen Bailey and Jessica Embury.

Carmen came to us around 2015, enrolled first in a GEOG 106 (World Regional Geography) class taught by Mark Goodman as a Middle College student. She struggled initially but through that class learned to develop good note-taking and study habits. She went on to become a Geography major, excelled in courses, was hired as an in-house Earth Sciences tutor where she was then able to help others become successful, was an award winner at the 57th Annual Academic/Service Awards ceremony, went on to SDSU, received several scholarships (e.g., the 2019 Lauren Post Memorial Scholarship), and most importantly has been hired full-time as a County of San Diego GIS Technician for the Land Use and Environmental Group. To see what a shining star Carmen is, check out the video recorded at the last Environmental Systems Research Institute's (ESRI) conference at

<https://www.facebook.com/esrigis/videos/carmen-baily-see-what-others-cant/1112980179092168/>

Another recent female student super star is Jessica Embury. Jessica, like Carmen, is working in the field of GIS but for the City of San Diego. Below are the contents of an email Jessica recently sent to Dr. Abu-Ghazaleh, Grossmont College President in which she describes the benefits she received from taking classes within the Earth Sciences Department. Jessica, also like Carmen, was hired by the Department to work as a tutor while still a student here.

Dear Dr. Abu-Ghazaleh,

Hello, my name is Jessica Embury and I just completed my first semester at SDSU as a transfer student from Grossmont College. I attended Grossmont College during the Fall 2018 and Spring 2019 semesters, and I completed all major-related prerequisite coursework through the Earth Sciences Department. I am so grateful to the faculty for providing the real-world skills and deep contextual understanding that I've needed to succeed as I pursue my degree in Geographic Information Science and Technology. I truly feel that Grossmont's geography courses, especially the Geographic Information Science course taught by Professor Judd Curran and Professor Mark Goodman, are responsible for the many opportunities I've had so far at SDSU.

In November, I began a GIS related internship with the City of San Diego's Parks and Recreation Department. I have spent the last several months working on a variety of projects within the Open Space Division. The scope of these projects have ranged from data organization related to Maintenance Assessment Districts, to the creation of maintenance crew maps and informational maps for the public. I have recently been asked to manage the GIS side of a new program that aims to streamline data collection by Rangers and minimize data redundancy.

At SDSU, I recently completed a project that analyzed the relationships between heat-related deaths and different temperature variables. This project was voted "best in class" by both my classmates and my professor, and is being prepared for entry into the 2020 Student Research Symposium. As a result of this project, I was invited to join one of SDSU's research centers, the Center for Human Dynamics in the Mobile Age, where I will be working on a project examining the spatial disparities of cancer rates. In addition, I am being encouraged by the Department chair to pursue my Master's Degree and seek a funded assistantship.

I would like to mention again that I have only completed one semester at SDSU, so most of my current knowledge and skillset was developed at Grossmont College. I would like to formally thank Professors Curran and Goodman,

as well as the entire Earth Sciences team, for their support and commitment to my education. They have had an undeniably positive impact on my life and future.

*Kind Regards,
Jessica Embury*

While the Department does not generate huge numbers of majors, those we do produce receive a quality education that prepares them for transfer and subsequent employment in a variety of fields. We have a very loyal following by those who have passed through our doors and they are very appreciative of the high level of academic standards they were held to while at the same time receiving encouragement and support from the faculty. We are proud of our students and their successes.

We have also had instances where students with difficult family backgrounds have found a “home” in our department and over time, as a result of taking our classes, interacting with the faculty, becoming involved with the Department, have come out of their shells and made real progress not only academically but socially as well. To us, these are some of the most important contributions we can make within our community but are not necessarily things that get quantified in administrative metrics.

SECTION 6 - STUDENT SUPPORT AND CAMPUS RESOURCES

PURPOSE OF SECTION 6: To determine how departments utilize various campus services.

- 6.1 Are the college’s student support services (Tutoring, Counseling, Health Center, Library, Financial Aid) adequate to meet your student’s needs? Please elaborate on your answer.

College support services in general seem to be adequately meeting student needs. The Department has worked to identify and mentor outstanding students to serve as in-house tutors. The students are then hired as tutors in subsequent semesters to help current students with concepts and study techniques in courses in which the tutor is qualified. This has been very successful in keeping students engaged and learning. Additionally, the Counseling Department has been very helpful with their innovative GeoCon program in which counselors would stop in for 5 minutes or so in a particular class, introduce themselves to students, and inform them of their availability within the Earth Sciences office to meet and go over education plans. Many students took advantage of this tremendous opportunity to easily meet personally with a competent and caring counselor, figure out their path, and move forward toward a degree or transfer more quickly. Unfortunately, for reasons not entirely clear to us but having something to do with issues within the Counseling Department, this important and successful program was recently discontinued. It would be our hope that Program Review would recognize the value of this program and help by recommending that it be reinstated and supported fully in the future.

- 6.2 What services do students in your department/program use most often or that make the most difference? Can you provide any examples where services have clearly improved student retention and success?

Easily our most important resource for retention and success are our Earth Science tutors specifically trained by taking our courses and working with instructors on a one-on-one basis. We have had the ability to house and manage these tremendous tutors within our department and we believe this is the number one resource that has increased student success in our courses in recent years. We recently entered into a sort of pilot program working with the campus-wide tutoring team to help manage our tutors while continuing to allow them to remain on site in our department office where they are most effective for students. It's too early to know what the effects of this new change in tutor management will be, however, it is our hope that Program Review will recognize the importance of this in-department tutoring to us and to student success and will thus recommend that in the future whatever may be necessary to maintain this process should be done.

- 6.3 Are college support services adequately supporting your faculty and staff? Consider the following support services: IT, Instructional Operations, Business Services, Printing, Bookstore, Maintenance, CAPS, and any other support services important to your faculty and staff.

Support services have been available and helpful when needed. Of late we have been experiencing numerous IT-related problems. While members of that department have been pretty prompt in their responses, not all problems seem to have been resolved. For examples, computers in the GIS lab this semester consistently have issues with taking an incredible long time to start up after students log in. On more than one occasion, students were unable to follow along with the hands-on demonstration that was provided as they had no computer on to which they could work.

SECTION 7 – ON-CAMPUS/OFF-CAMPUS INVOLVEMENT

PURPOSE OF SECTION 7: The purpose of this section is for your department to showcase the most meaningful outreach, engagement and retention work that you do, both on and off campus. We are interested in learning what the faculty and staff in your department do maintain/enhance their status as professionals in their field and as instructors, how you represent the college in the community/region, interact with other departments around campus, serve the college and your students, and participate in campus life.

The first table you see in this section is INFORMATIONAL ONLY, so you can understand what type of information you should be providing for this section. The second table you will see is the suggested table format you should use to display your information for this section.

TABLE ONE: INFORMATIONAL ONLY – PLEASE ADDRESS THE CONTENT IN THIS TABLE

OFF CAMPUS	ON CAMPUS
Marketing Flyers, brochures, booths, radio	Marketing Flyers, brochures, booths, Summit newspaper
Discipline Specific activities	

Conferences, Clubs/Organizations, Department Events, Licensing Meetings, Technical Reviews/peer reviewing manuscripts/textbooks and other discipline-specific volunteer activities, regional and state task forces	Campus Volunteerism Involvement in college and other department's activities (campus open houses, science fair, water project, helping out as a theater usher or at a sports team event)
Community Involvement Advisory committees, serving in regional groups, K-12 outreach, Job Fairs, other college-related but not discipline-specific activities	Interdisciplinary Collaboration Collaborating on shared events, cross-listed courses, working with campus student services, linked courses (sharing of expertise/resources between departments to benefit student success, such as guest lectures, shared lab activities, simulation or other special events)
Professional Development Attendance, creation/presentation, grants, sabbaticals	Professional Development Workshop Attendance, creation/presentation of professional development activities, grant-writing and sabbatical projects

Table two on the next page shows how you should organize your activity data. Complete this table with your commentary.

If you need assistance in creating a table, please contact the Program Review Chair. If you are using word, simply select 'insert' from the main menu, then table, and then select the number of columns and rows you want for your table.

TABLE TWO: SUGGESTED TABLE FORMAT

Faculty	Marketing On and Off Campus	Year(s)	Value to Student Success
Tim Cliffe			
Judd Curran	Week of Welcome Volunteer. Developed course advertisements for display around campus in print and digitally. Digital advertisements have been displayed on class websites, in Canvas, on Facebook, Twitter, and on the digital screens in the student center. Fliers have also been developed for counselor use, and for distribution on bulletin boards and in classes.		
Mark Goodman	WOW table staffer, Coordinator for community science fair at Fletcher Hills Elementary School		
Gary Jacobson			
Scott Therkalsen	WOW Week table staffer; WOW Week presenter; Staffed Earth Science tables during quad events; Presenter each semester in campus-wide Political Science week; Organizer of Elementary School Earth		Interaction with students.

	Science room during Science night. Designer of both course specific and department marketing flyers and brochures; Subject of Summit Newspaper article in coverage Political Science week talk.		
Anne Teachout	Anne is brand new and has not yet had time to become involved in the area.		
Faculty	Campus Volunteerism	Year(s)	Value to Student Success
Tim Cliffe	Academic Senate member		
Judd Curran	Chair, Council of Chairs and Coordinators Academic Senator Tri-Chair, Enrollment Strategies Committee Co-Chair, Budget Committee Co-Chair, Earth Sciences Department AFT Site Representative AFT Executive Council V.P. College Council Advisory Member Member of Building 36 Planning/Design Committee Served on Earth Science Technician Hiring Committee twice Served on VP Hiring Committee at Cuyamaca College Served on Math Full-Time Faculty Hiring Committee Served on Geol/Ocea FT Faculty Hiring Committee Member of the Planning and Resources Council (former) Member of the IEPI Strategic Enrollment Management Team, including development of an Integrated Master Calendar. Presented at the ACCJC Partners in Excellence Conference on "Strengthening Institutions and Building Leadership Capacity Through Strategic Enrollment Management" in May, 2019. Co-Developed a Strategic Enrollment Management Canvas Resource Hub for Grossmont College Worked with the GCCCD Board on the adoption of a Climate Change Literacy Resolution		
Mark Goodman	Guest speaker at Grossmont College's Veterans Recognition Dinner. Co-organizer of President's annual BBQ. Academic Senate member Geology/Oceanography Hiring Committee Member Earth Sciences Technician Hiring Committee Member Co-Chair, Faculty Professional Development Co-Chair, Earth Sciences Department (2016-2018) Academic Senate member	2016-2018 20 yrs 2019 2018 2011-2014	Interaction with students and working to make the college a better place for students.
Gary Jacobson	Academic Senate member		Staying abreast of issues affecting students.
Scott Therkalsen	Faculty Staffing Committee member and Chair Student Disciplinary Committee member Sabbatical Leave Committee member	2013-19 2012-16 current	Working with students to resolve issues, increasing knowledge base.
Anne Teachout	New		

Faculty	Discipline Specific Activities	Year(s)	Value to Student Success
Tim Cliffe	Geologic/Geographic exploration of Iceland Awarded prestigious “Annual Friend of Geography” by the California Geographical Society annual meeting in Sacramento, and 2017 Teaching Excellence Award.		Increase knowledge base, commitment to mastering the craft of teaching.
Judd Curran	Developed new course: GEOG 101. Developed new COA in Data Sciences with CSIS. Developed Climate Change resources document for teachers throughout the state of California. Active member and attendee of the California Geographical Society (CGS) and the CGS Annual Conference Extensive travels globally for geographic exploration. Acquired a grant from the GCCCD Foundation for developing a virtual reality topographic model. Led students to the California Geographical Society’s annual conference annually to present their Geography 104 (GIS) final project posters. Hosted, organized, and coordinated the Annual Conference of the California Geographical Society at Grossmont College in April of 2017.		Providing a course dealing with topics of great concern to many students that focuses on equity issues.
Mark Goodman	Geographic/Geologic exploration of Thailand and Cambodia		Currency and real world experience regarding SE Asia
Gary Jacobson	Sabbatical project-“PetraForge”	2015	Increased student engagement and diversification of success criteria.
Scott Therkalsen	Developed new course: GEOG 100 in online format. Geographic exploration of Turkey, Greece, Croatia, Bosnia, Israel, Jordan, China, and Belize.		Increase student access Currency and real- world experience
Anne Teachout	New		
Faculty	Community Involvement	Year(s)	Value to Student Success
Tim Cliffe	Development of GEOG 120 in an online format.		
Judd Curran	Member of the Environmental Caucus of the San Diego and Imperial Counties Labor Council. Member of the California Federation of Teachers Labor and Climate Justice Education Committee Provided soil development lecture to community garden. Collaboration with Griffin’s Pantry.		
Mark Goodman	“Thailand: An Introduction” presentation given to the La Mesa Kiwanis Club (January 2014) City of El Cajon Veteran of the Year 2018-2019 Commander, American Legion Post 303 Vice Commander, American Legion Post 303 S-1/Initial Entry Training NCO, CA State Guard HR Staff Officer, Div 1, US Coast Guard Aux. Rocks and Elements of Weather presentation to 3 rd -5 th graders at Fletcher Hills Elementary School.	2015-2019	Establish stronger ties with student veterans and military community to promote Department.

Gary Jacobson	Led field trips for the San Diego Buddhists Association	2017-2018	Karmic credit
Scott Therkalsen	Member and volunteer for OB Town Council; Member of Friends of the OB Library; Volunteer OB Pre-K; Member of Ocean Beach Planning Board		
Anne Teachout	New		
Faculty	Interdisciplinary Collaboration	Year(s)	Value to Student Success
Tim Cliffe	Development and participation in Earth Science Dept Flex Week trips.		Cross-discipline and cross-campus fertilization.
Judd Curran	Development and participation in Earth Science Dept Flex Week trips. Collaborated with AOJ on the establishment of a joint AOJ/GIS computer lab Developed new COA in Data Sciences with CSIS and CTE/Workforce Development		Cross-discipline and cross-campus fertilization.
Mark Goodman	Development and participation in Earth Science Dept Flex Week trips. "Historic US 395" presentation given to District faculty/staff, Lone Pine, CA (January 2019) "California's Borders" presentation given to District faculty and staff, El Cajon, CA (January 2018) "The Mojave Desert: US Military Presence" presentation given to District faculty/staff, Lancaster, CA (January 2016) "The US Numbered Highway System and Route 66" presentation given to District faculty and staff, Barstow, CA (January 2015)		Cross-discipline and cross-campus fertilization.
Gary Jacobson	Emoja-sponsored student success activity.	Fall 2019	Engaging students.
Scott Therkalsen	Development and participation in Earth Science Dept. Flex Week trips. Participation in campus-wide Political Science week in collaboration with that department. GEOCON participant.		Cross-discipline and cross-campus fertilization. Assisting students in meeting with counselors.
Anne Teachout	New		
Faculty	Professional Development	Year(s)	Value to Student Success
Tim Cliffe	Regular attendance at California Geographical Society's annual meeting.		Currency in field
Judd Curran	Regular attendance at California Geographical Society's annual conference Presented Flex-Week Presentations on Integrating the topic of Climate Change into All Courses		Currency in field
Mark Goodman	Organizing and co-leading meaningful Flex Week explorations.		Improve knowledge base and develop potential intern/job contacts for students.

Gary Jacobson	Online teaching certificate.	2019	Diversification of teaching delivery modes.
Scott Therkalsen	Regular attendance at California Geographical Society's annual meeting. Online teaching certificate Awarded division wide Excellence in Teaching certificate for online class Wrote grant to obtain video equipment for online lecture content		Currency in field. Creating options in terms of lecture delivery modes to meet more student needs.
Anne Teachout	New		

7.1 Referring to the above table, what activities contributed most to student success?

Activities in which instructors grew professionally contributed to the greatest student success. For example: 1) When PetraForge was in development, Gary Jacobson had to consider all possible paths which earth materials take en route to becoming rocks. The new found understanding translated into increased enthusiasm for teaching petrogenesis—a topic which traditionally does not engender widespread enthusiasm in students.

Travel, field experiences, Flex Week trips work to enhance instructors' knowledge base about places and concepts and contributes greatly to student engagement and success. Student engagement is increased when students can see or hear about experiences the instructor has had at actual locations discussed in lecture that otherwise may remote and distant. For example, Scott Therkalsen has been able to integrate video lectures recorded during his travels throughout the world into his courses on globalization and cultural geography (e.g. a discussion of Brexit, the Greek financial collapse and EU immigration while standing amongst protesters and graffiti in Greece). Additionally, while teaching World Regional Geography, travel experience to the regions under discussion increases the "authority" of the lecturer and in general excites students thus adding tremendously to student engagement and success.

7.2 Please provide an overall reflection on your department's activity displayed in your table.

The department is active on campus and in the community and within their respective disciplines. The Department members are committed to maintaining currency in their respective fields and in learning more themselves. This is done so as to produce high-quality academic experiences that keep students engaged and learning.

7.3 Are your overall faculty professional development needs sufficient to ensure students are successful in your program?

Yes X No ____ (This is accomplished in part through the continued development and participation by our Department in relevant Flex Week Field Trips.)

If no, please describe what faculty professional development needs are not being met.

SECTION 8 – FISCAL & HUMAN RESOURCES

PURPOSE OF SECTION 8: *To assess if the college is meeting the resource needs of your department and if your department is using those resources efficiently.*

NOTE: All required data tables and graphs will be compiled and delivered to you by the Program Review Data Liaison.

Fiscal Resources

Refer to the Table provided that shows Enrollment, % Fill, Earned WSCH, FTEF and WSCH/FTEF to answer these questions. Data for Fall, Spring and Summer semesters are provided separately.

Earth Sciences (Combined Total)					
	FA13	FA14	FA15	FA16	FA17
Earned Enroll	1,444	1,127	953	841	805
Max Enroll	1,659	1,575	1,490	1,318	1,319
% Fill	87.0	71.6	64.0	63.8	61.0
Earned WSCH	4285.3	3440.6	2887.6	2580.4	2391.6
Total FTEF	7.12	6.90	6.78	6.78	5.83
Earned WSCH/FTEF	602.1	498.6	425.7	380.4	410.0
	SP14	SP15	SP16	SP17	SP18
Earned Enroll	1,187	998	862	896	954
Max Enroll	1,555	1,677	1,354	1,522	1,358
% Fill	76.3	59.5	63.7	58.9	70.3
Earned WSCH	3621.4	3063.3	2592.1	2730.1	2937.9
Total FTEF	6.73	7.62	6.32	7.07	6.72
Earned WSCH/FTEF	537.8	402.2	410.4	386.3	437.4
	SU13	SU14	SU15	SU16	SU17
Earned Enroll	17	67	112	109	61
Max Enroll	26	70	132	190	100
% Fill	65.4	95.7	84.8	57.4	61.0
Earned WSCH	69.5	213.1	328.3	302.2	159.1
Total FTEF	0.28	0.48	0.68	1.08	0.68
Earned WSCH/FTEF	245.5	441.2	480.5	279.0	232.8

Geography					
	FA13	FA14	FA15	FA16	FA17
Earned Enroll	838	635	531	507	446
Max Enroll	962	928	864	762	714
% Fill	87.1	68.4	61.5	66.5	62.5
Earned WSCH	2,514.0	1,982.4	1,621.6	1,578.4	1,371.4
Total FTEF	4.05	4.13	3.93	4.13	3.33
Earned WSCH/FTEF	620.7	479.7	412.3	381.9	411.5
	SP14	SP15	SP16	SP17	SP18
Earned Enroll	658	538	479	546	567
Max Enroll	883	973	752	820	796
% Fill	74.5	55.3	63.7	66.6	71.2
Earned WSCH	2,020.0	1,640.0	1,467.0	1,656.0	1,741.0
Total FTEF	3.80	4.33	3.53	3.73	3.93
Earned WSCH/FTEF	531.6	378.5	415.2	443.6	442.6
	SU13	SU14	SU15	SU16	SU17
Earned Enroll	0	0	82	75	40
Max Enroll	0	0	82	100	60
% Fill	N/A	N/A	100.0	75.0	66.7
Earned WSCH	0	0	243.4	208.7	101.5
Total FTEF	0	0	0.48	0.68	0.48
Earned WSCH/FTEF	N/A	N/A	503.8	305.4	210.0

Geology					
	FA13	FA14	FA15	FA16	FA17
Earned Enroll	342	246	229	179	203
Max Enroll	415	365	394	334	383
% Fill	82.41	67.40	58.12	53.59	53.00
Earned WSCH	979.29	691.03	687.00	537.00	552.20
Total FTEF	1.92	1.62	1.90	1.70	1.55
Earned WSCH/FTEF	510.84	427.35	361.58	315.88	356.26
	SP14	SP15	SP16	SP17	SP18
Earned Enroll	306	270	206	245	241
Max Enroll	390	422	320	470	330
% Fill	78.46	63.98	64.38	52.13	73.03
Earned WSCH	932.42	853.31	594.14	759.09	758.91
Total FTEF	1.78	2.13	1.63	2.38	1.83
Earned WSCH/FTEF	522.89	400.02	363.77	318.50	413.96
	SU13	SU14	SU15	SU16	SU17
Earned Enroll	17	67	0	12	0
Max Enroll	26	70	0	50	0
% Fill	65.38	95.71	N/A	24.00	N/A
Earned WSCH	69.49	213.12	0	33.19	0
Total FTEF	0.28	0.48	0	0.20	0
Earned WSCH/FTEF	245.53	441.24	N/A	165.94	N/A

Oceanography					
	FA13	FA14	FA15	FA16	FA17
Earned Enroll	264	246	193	155	156
Max Enroll	282	282	232	222	222
% Fill	93.6	87.2	83.2	69.8	70.3
Earned WSCH	792.0	767.2	579.0	465.0	468.0
Total FTEF	1.15	1.15	0.95	0.95	0.95
Earned WSCH/FTEF	688.7	667.1	609.5	489.5	492.6
	SP14	SP15	SP16	SP17	SP18
Earned Enroll	223	190	177	105	146
Max Enroll	282	282	282	232	232
% Fill	79.1	67.4	62.8	45.3	62.9
Earned WSCH	669.0	570.0	531.0	315.0	438.0
Total FTEF	1.15	1.15	1.15	0.95	0.95
Earned WSCH/FTEF	581.7	495.7	461.7	331.6	461.1
	SU13	SU14	SU15	SU16	SU17
Earned Enroll	0	0	30	22	21
Max Enroll	0	0	50	40	40
% Fill	N/A	N/A	60.0	55.0	52.5
Earned WSCH	0	0	84.9	60.3	57.6
Total FTEF	0	0	0.20	0.20	0.20
Earned WSCH/FTEF	N/A	N/A	424.3	301.7	288.0

- 8.1 Describe any patterns in enrollment; maximum enrollment and % fill in the program since the last program review. What are typical section maximum sizes (capacity) for your courses and what dictates those caps? Have you changed the number of sections offered and/or section sizes in response to changes in demand? If so, what effect has it had?

Geography has witnessed a significant and somewhat sudden decrease in the number of younger students—those under age 20. A similar trend was not observed within other age groups. This indicates that our sudden enrollment drop has occurred in conjunction with activities taking place in the Counseling Department where young, new students have a quick counseling session and then are introduced to an Educational Plan. Apparently, Earth Sciences courses are not be presented as viable options. Thus, the decrease in enrollments by this age cohort is not a reflection of a lack of value or quality but by not provided with Earth Sciences options in that initial counseling session. This is indeed unfortunate as concepts and topics taught throughout the Earth Sciences courses have been explicitly developed to be application focused and reality based. Think, for example, of the Flint, Michigan drinking water

crisis, coastal flooding impacts and migrations, the negative social, environmental, and economic impacts of globalization, the global distribution of inequality, factors contributing to the diffusion of infectious diseases, and the like.

Most Geology and Oceanography classes are taught in the same room, because both greatly benefit from access to the large collection of specimens permanently housed in 36-353. Class maxes for oceanography and geology lecture courses are determined by the room max for 36-353, which is 50. To increase fill rates for geology classes, while still having access to geologic specimens, beginning in the fall of 2015, the department began using the Earth Science lab room, 30-208, which has a room max of 32. The practice had little effect on fill rates, however, in part because only one section of Geology 110 was taught in 30-308, but there are more important factors at play which are discussed in section 5.1.

Although Geology enrollments follow the general decline seen campus wide for the period, the percent decline was greater for Geology. The difference may be attributable to state efforts to limit the number of units students take in “exploratory” courses and guide them into sciences that are seen as being more foundational (e.g. chemistry and physics) as well as being overlooked as options by counseling. As the number of offered sections of Geology 110 has declined from 4-5/semester to now 2/semester, the percentage of our lower-enrolled courses (major’s classes like Earth History) has increased, thus lowering our overall efficiency (Earned WSCH/FTEF) to below the college average.

Another factor contributing to Geology’s enrollment and efficiency declines may be that a large proportion of Geology classes were taught by adjunct in the last 5 years. This was especially the case when Gary Jacobson went on sabbatical in fall 2015 and virtually all Geology and Oceanography classes were taught by adjunct. Geology’s and Oceanography’s biggest declines in enrollment and efficiency happened in the two semesters following long-serving, full-timer Gary Jacobson’s sabbatical.

Oceanography’s enrollment declines were slightly greater than the college average, but not as great as those for Geology. Earned WSCH/FTEF for Oceanography has generally exceeded the college average. Fall efficiency in Oceanography is consistently higher than spring, a fact that may reflect that younger students tend to take Oceanography (see Appendix 2: OCEA—Enrollment by Age), and that younger students are less likely to have declare a major. Undecided students are more likely to enroll in a course they consider interesting (i.e. oceanography) when they first come to Grossmont. In later semesters such students may be more focused on courses they must take for their major.

- 8.2 Describe and explain any patterns in Earned WSCH, FTEF and Earned WSCH/FTEF since the last program review. Please explain changes in FTEF due to changes in faculty staffing levels. For courses/sections with low Earned WSCH/FTEF explain their importance in the program and measures the department/program has taken/plans to take to improve efficiency and/or balance low and high efficiency offerings and/or maximize course % fill.

Over the study period, Earned WSCH across Geography, Geology, and Oceanography has declined. A slight increase in Earned WSCH happened between Spring 16 and Spring 18, a result of increases in Geography and Geology, but not Oceanography. Summer does not follow the same trends as Fall and Spring because course offerings vary significantly from summer to summer as a function of faculty availability to teach courses.

The Department has also experienced declines in FTEF for the period in question. These declines are most evident in the Fall data, dropping from 7.12 in Fall 2013 to 5.83 in Fall of 2017. This, unfortunately, puts the Department FTEF below the number of full-time instructors on staff. Spring FTEF data does not show the same trend because there are several courses (e.g. GEOG/GEOL/OCEA 150; GEOG 140; and GEOL 121) that have protected status and only offered during spring semesters. The declines in FTEF reflect draconian section slashing by administration over the past several years.

From 2006 to 2012, WSCH/FTEF within the Earth Sciences Department exhibited an upward trend. However, from Fall of 2013 to Spring of 2018, WSCH/FTEF fell back to Fall 2006 levels. The trend of declining WSCH/FTEF is present in Geography, Geology, and Oceanography. This reduction is due most likely to a system-wide decrease in enrollment and the slashing of sections that continue to take place today.

Despite administrative decimation of the total number of sections taught by the Department since the last program review, a corresponding increase in efficiency was not seen until Spring 2018 when some of our Department efforts began to pay off. These include: Department-wide adoption of Zero Textbook Cost (ZTC) courses, aggressive marketing/advertising campaigns, working closely with counseling via the GeoCon program, diversifying the curriculum to provide more opportunities for student success and offering new courses to capitalize on student interest. Although not reflected in Earned WSCH/FTEF data, the Department did its part in maximizing classroom efficiency by scheduling certain sections in rooms with lower class maximums.

- 8.3. For money that you get from the college and/or from Perkins funds as part of your budget, is this amount adequate? What is this money used for to operate your department? If it is not adequate, please explain how additional funds would be used to improve student learning and success.

NA

PURPOSE OF SECTION 8.4: The committee is looking to recognize program/department efforts for outside funding.

8. 4 If your program has received any financial support or subsidy outside of the college budget process (grants, awards, donations), explain where these funds are from, how they are used, and any other relevant information such as whether they are on-going or one-time.

Former Earth Sciences Department Technician Krissy Lovering put together a grant request to the Foundation for Grossmont and Cuyamaca Colleges for which we received a one-time Innovation in Student Success Grant (2016-2017) award. This award, in the amount of \$4,120, helped the department to acquire and set up an Augmented Reality Sandbox—an interactive AR 3-D tool. As the sand (yes, there is actual sand) is shaped into different forms, a sensor detects those changes and projects contour lines and elevation range colors onto the sand in real time. Virtual rain can be generated to then allow one to observe water flow across the created sandscape. The flow of water downslope to lower elevations is based upon real models of fluid dynamics. As Krissy had left her position before the sandbox was completely set up, that difficult task fell to our new Department Technician, Julie Burcham.

In 2018 the department received a grant from ASGC along with an augmentation from the MNSESW Division to purchase video recording equipment. The grant from ASGC was a one-time award in the amount of \$500 and its purpose, as stated in the grant application was: *“to supplement department funds to purchase video recording equipment in order to improve the Earth Science online education curriculum. As we've expanded our online offerings we have continued to strive to uphold the highest Grossmont standards and actually offer students an experience that is equivalent to the one they receive in our face-to-face lessons. In order to do this we have started producing lecture videos that contain in class footage edited together with "on location" footage, screen captures, and other resources available online... In addition to creating quality online content for our new online classes we are also creating supplemental material for our on campus courses. The videos we create allow students to make up the lectures for courses that they have missed and also allow students to review lectures at their own pace (i.e. pausing videos). Currently the college has limited quantity and availability for such equipment.”*

This grant was instrumental in allowing the department to create much of the innovative online content mentioned in other portions of this document.

Human Resources

Earth Sciences (Combined Total)					
	FA13	FA14	FA15	FA16	FA17
FT Faculty Count	6	6	5	5	5
PT Faculty Count	6	9	11	5	4
Full-Time FTEF	4.80	3.58	3.73	5.28	4.53
X-Pay FTEF	0.87	0.60	0.20	0	0.20
Part-Time FTEF	1.45	2.72	2.85	1.50	1.10
Total FTEF	7.12	6.90	6.78	6.78	5.83
FT Percent	79.6%	60.6%	58.0%	77.9%	81.1%
Permanent RT	0.27	0.27	0.34	0.32	0.28
Temporary RT	0.40	0.40	0.20	0.42	0.46
Other	1 ^A	1 ^A	1 ^S		
	^A Interrim Adminstrator			^S Sabbatical	

Geography					
	FA13	FA14	FA15	FA16	FA17
FT Faculty Count	4	3	4	4	4
PT Faculty Count	0	3	1	1	0
Full-Time FTEF	3.45	2.38	3.33	3.73	3.13
X-Pay FTEF	0.60	0.60	0.20	0	0.20
Part-Time FTEF	0	1.15	0.40	0.40	0
Total FTEF	4.05	4.13	3.93	4.13	3.33
FT Percent	100.0%	72.2%	89.8%	90.3%	100.0%

Geology					
	FA13	FA14	FA15	FA16	FA17
FT Faculty Count	2	3	1	2	2
PT Faculty Count	3	3	7	3	3
Full-Time FTEF	0.95	0.80	0.40	0.95	0.8
X-Pay FTEF	0.07	0	0	0	0
Part-Time FTEF	0.90	0.82	1.50	0.75	0.75
Total FTEF	1.92	1.62	1.90	1.70	1.55
FT Percent	53.1%	49.5%	21.1%	55.9%	51.6%

Oceanography					
	FA13	FA14	FA15	FA16	FA17
FT Faculty Count	2	1	0	1	1
PT Faculty Count	3	3	3	1	1
Full-Time FTEF	0.40	0.40	0	0.60	0.60
X-Pay FTEF	0.20	0	0	0	0
Part-Time FTEF	0.55	0.75	0.95	0.35	0.35
Total FTEF	1.15	1.15	0.95	0.95	0.95
FT Percent	52.2%	34.8%	0.0%	63.2%	63.2%

NOTE: Please refer to the table provided by the Program Review Data Liaison to answer the following questions.

PURPOSE OF SECTION 8.5 & 8.6: The committee is interested in knowing about the people in your department and what they do. The committee also wants to understand your department/programs staffing needs.

8.5 Describe the roles and responsibilities of full-time versus part-time faculty in your department. If any trends or changes are apparent in the past six years, please explain the reasons for them.

The full-time faculty within the Earth Sciences Department are responsible for the day-to-day administration of the various programs within Geography, Geology, and Oceanography. Being a relatively small department that has experienced administration-demanded cuts (along with many other departments across campus) means that the vast majority of courses are taught by full-time faculty members. At present, we have but two adjunct faculty member teaching in Geography, one teaching in Oceanography, and one teaching in Geology. For Spring 2020, one of the part-time instructors in Geography nearly had their class cancelled. It was only from the efforts of that instructor, with support from the Department, to physically go out on campus and recruit students that the numbers enrolled in the class on the first day it met were satisfactory to the Dean (who came by the class to check on the numbers). The Department makes every effort to mentor and assist adjunct faculty to help them become better instructors and improve student success rates. However, due to the continued demand from administration to cut sections, we do not foresee adding additional part-time faculty members any time soon.

- 8.6 Are the current levels of staffing of faculty adequate? Discuss part-time vs. full-time ratios and issues surrounding the availability of part-time instructors as well as duties and responsibilities of full-time faculty members that influence their loads (such as reassigned time and use of overload).

Current levels of full-time faculty staffing are adequate. Full-time members of the faculty have also historically been very active in campus affairs and committees. For example, Judd Curran (Geography) has received release time for AFT since Fall 2013, Chairs and Coordinators release time since Fall 2016, and beginning in Fall 2019, release time for Enrollment Strategies Committee. Several members have acquired release time for taking on Department Chair duties since the last Program Review: Judd Curran, Mark Goodman, and Gary Jacobson. As mentioned above, the Department has some of the fewest part-time faculty members teaching since at least the last 20 years (and probably more) and does not envision expanding our part-time faculty ranks any time soon.

- 8.7 If staffing levels are not adequate, give a justification of your request for increased Full Time faculty based on how this position would contribute to basic department function and/or the success, retention and engagement of students in the program.

With the Fall 2019 hiring of Anne Teachout, staffing levels are adequate for full-time faculty. A problem frequently encountered is the availability of quality part-time faculty should the need arise (e.g., banked leave, sabbatical, etc.). And, while full-time staffing needs are met—something that for years was not met—the impending (within a semester or two) retirement of Gary Jacobson will put the department back into not being fully staffed with full-timers.

- 8.8 In the table below, list non-faculty positions that are responsible to your program (by title rather than by individual name). This list should include classified staff as well as work study and student workers.

Indicate the FTE/hours and where funding comes from for these positions. Add or delete rows to the table as needed. If you have questions on how to complete this table, please contact the Program Review Committee Chair.

Position	Funding	FTE/Hours					
		YR 1	YR 2	YR 3	YR 4	YR 5	YR 6
Earth Sciences Dept. Tech.			1	1		1	1

8.8 Briefly describe the duties for each position. Include a discussion of any changes in terms of non-faculty staffing and describe the impact on basic department function and/or the success of students in the program. Are current staffing levels adequate in non-faculty positions? If not, give a justification of your request for increased resources.

We have come to learn that the job description and classification that was used by HR to hire the new Earth Science Technician was incorrect. The initial hiring of the position in 2015 used a specific, Department-created announcement and job description tailored to the unique Earth Sciences position. Unfortunately, when it was necessary to rehire the position Human Resources independently used a generic “lab tech II” job description. The original position was not hired under the generic lab tech description because it was known that this position is not a standard lab technician position and the duties are much different than laid out in the generic lab tech classification. It has become increasingly apparent that the expectations the Department had for duties included in the job of an Earth Science lab technician are not covered in the current way the position is classified; as a result of this, the position is not able to be utilized as intended. The duties that are required by the Department and which do fall within the current job description, unfortunately, potentially do not equate to full time. This mistake necessitates the reclassifying of this position with the correct job description, so that that the position fully enhances Department offerings as originally intended, even if it requires a rehire process to align unique Department needs with unique contract language.

SECTION 9 – SUMMARY AND RECOMMENDATIONS

PURPOSE OF SECTION 9: The purpose of this section is to demonstrate how your department/programs ties in to the college's 2017 – 2022 Strategic Plan targeted goals of Outreach, Engagement and Retention.

9.1 Summarize program strengths in terms of:

- Outreach

Some of our best outreach is done by our outstanding former students. We have had numerous instances where someone enrolls in one of our courses based on the recommendations they received from students who have previously taken our classes.

The Department has created information, marketing, and communication materials for prospective and incoming students.

The Department has participated in a wide range of activities to attract and help new students.

The Department has worked closely with the Renee Tuller and Stephanie Decker in the Counseling Department through their successful and innovative GeoCon program.

- Engagement

A strength of the Department lies with the faculty to have developed a massive amount of cross-disciplinary work. For example, Tim Cliffe in geography has collaborated and developed and taught geology classes, Judd Curran and Scott Therkalsen have generated the new Global Issues and Globalization courses and Mark Goodman has taught for several semesters now the SCI 110 (Introduction to Scientific Thought) course. This particular course was developed within the Chemistry Department by John Oakes. John was of the opinion that the Earth Sciences Department should be involved in that course due to the cross-disciplinary strengths inherent within our programs. He was pleased that upon his retirement, the Earth Sciences Department had a hand in teaching his “baby”.

The Department has provided numerous structured opportunities for faculty, staff, and students to engage in face-to-face communication.

Department members work with one another in course design to help engage students in the learning process.

A common workspace area has been a staple of the Earth Sciences Department for decades. This space allows for faculty and students and tutors to interact and work with one another. This helps to build relationships, inspire confidence, and identify problem areas for students.

Many of our courses now have open-note exams to encourage students be engaged with the lecture, develop effective note-taking skills, and improve their grades.

- Retention

Faculty members identify students having difficulties early in the semester and attempt to steer those students into resource areas that would be of benefit to them.

Faculty members create positive learning environments and let students know we care about their success.

We have moved our courses into the Zero Textbook Cost (ZTC) realm and have provided a bookshelf in the Department with various textbooks (some old, some new) should students wish to review material or to investigate particular topics in more detail.

The hiring of high quality in-house tutors (both male and female) has helped tremendously in retaining students.

9.2 Summarize program weaknesses in terms of:

- Outreach

While we do what we can, it would be helpful if more support came to the Department from administration and the Counseling Department. With counseling, this could be in the form of a resumption of the very successful GeoCon program.

- Engagement

The Department insists that the student-centric floor plan as we have proposed as part of the Building 36 remodel be met and that we maintain the ability to hire an adequate number of quality in-house tutors.

- Retention:

GEOG 104, Introduction to Geographic Information Science (GIS) has witnessed significant growth in enrollments over the past several semesters. Creation of additional GIS courses, such as those offered by San Diego Mesa College and Southwestern College, could serve as a reason for students to continue to develop skills and abilities in an industry for which jobs are available by staying at Grossmont College.

At present we don't have adequate teaching facilities. The temporary facilities in which we are housed at present don't make it easy for students to be completely comfortable during lecture presentations as they have difficulty seeing visuals displayed on screens due to lighting issues, information and diagrams on whiteboards due to visual obstructions via Smart-carts, etc.

9.3 Describe any concerns that may affect the program before the next review cycle such as retirements, decreases/increases in full or part time instructors, addition of new programs, external changes, funding issues etc.

By the time of the next Program Review, at least two full-time faculty members most likely will have retired—Jacobson in Geology and Goodman in Geography. The retirement of these two would reduce our full-time ranks by a third.

We are concerned that any further cuts to our section offerings will critically damage and degrade our programs to the point that they are no longer viable. Thus, there needs to be a commitment to maintain a broad spectrum of disciplines in order to truly fulfill the promise of the community college.

9.4 Make a rank ordered list of program recommendations for the next six-year cycle based on the College's new Strategic Plan which includes outreach, engagement, and retention.

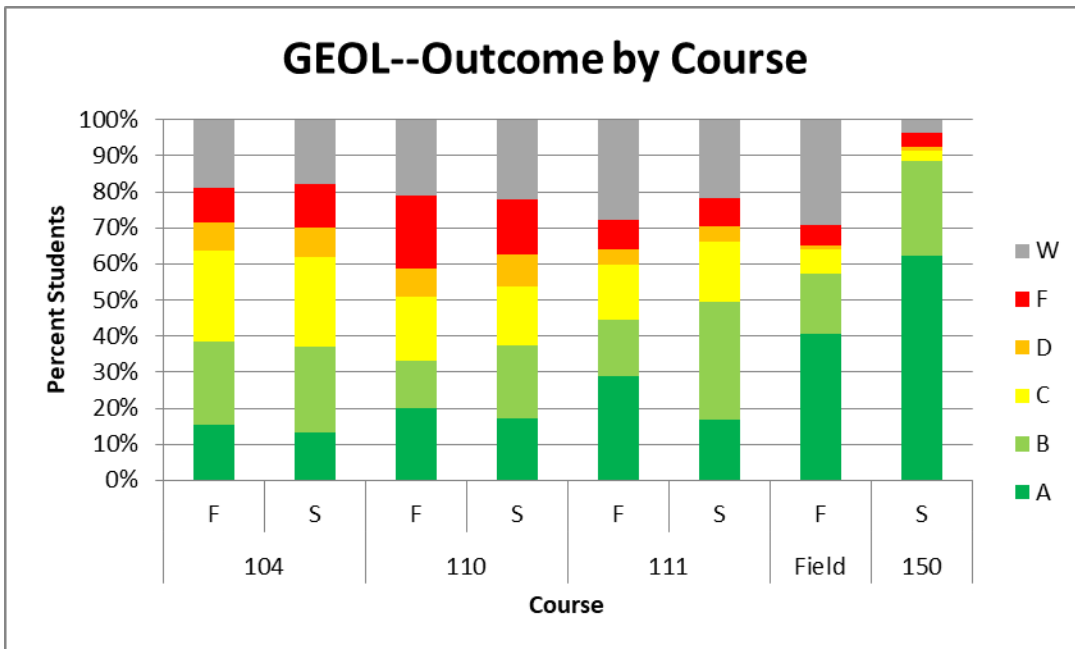
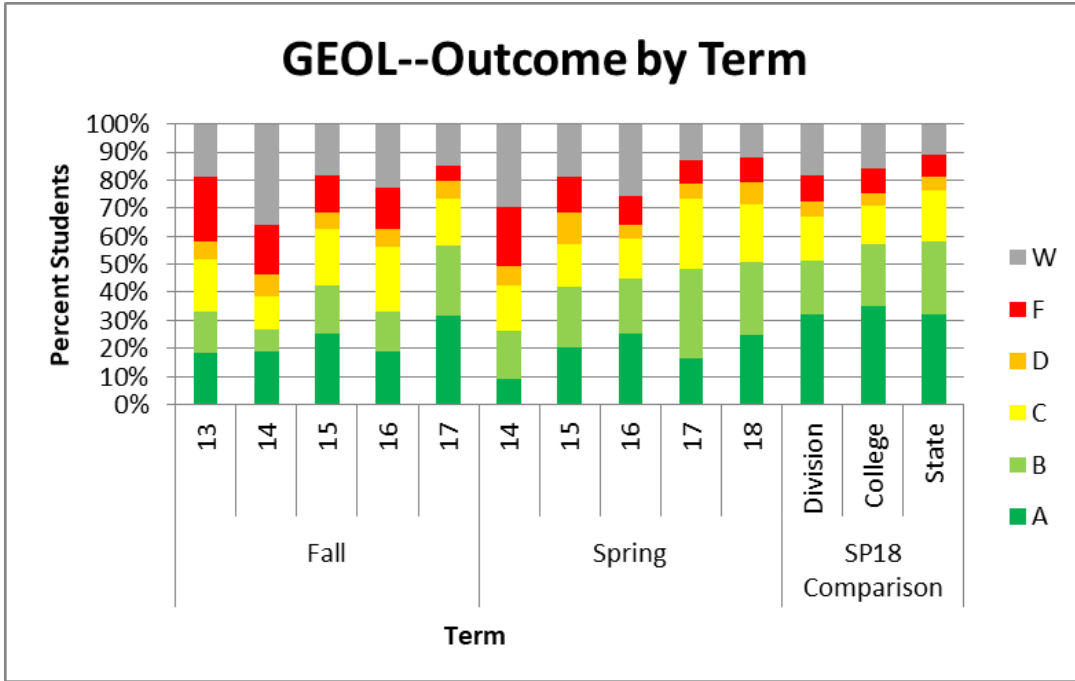
1. Acquire permanent lecture classroom space designed to support our programs and students. Quality lecture and lab spaces are things students deserve.
2. Acquire permanent office space that replicates the successful model we've employed for decades. This model is one that is accessible and beneficial to students and one they like in that there is a dedicated common workspace for faculty, students and tutors.

3. Provide space within the new Earth Sciences Department office for the proven innovative and successful GeoCon program spearheaded by Renee Tuller and Stephanie Decker of the Counseling Department.
4. Expand GIS and continue to incorporate new GIS courses into any Data Science certificates or programs.
5. Continued funding for field courses.
6. Continue our work along the lines of SLOs whereby we, as a department, discuss, test, and analyze what works best to improve student engagement, success, and retention.
7. Receive support to continue our work in producing high-quality, innovative and engaging distance education materials.
8. Having our courses which deal with important environmental issues (e.g., water, power, transportation—the things that make societies able to function and progress and are tied to issues in the news) be recognized by the Counseling Department as an important and viable general education option for students. Under-represented student populations generally have very limited or no knowledge or understanding about these important issues (e.g., where does the water come from?) and thus, Earth Science course are ideal for these student populations.

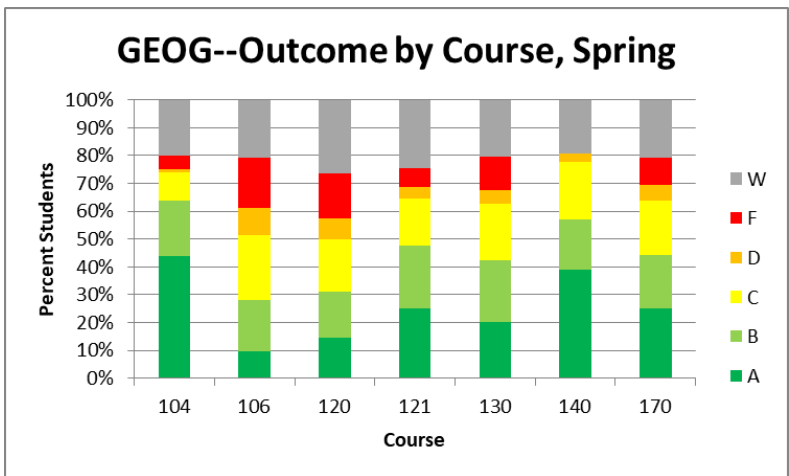
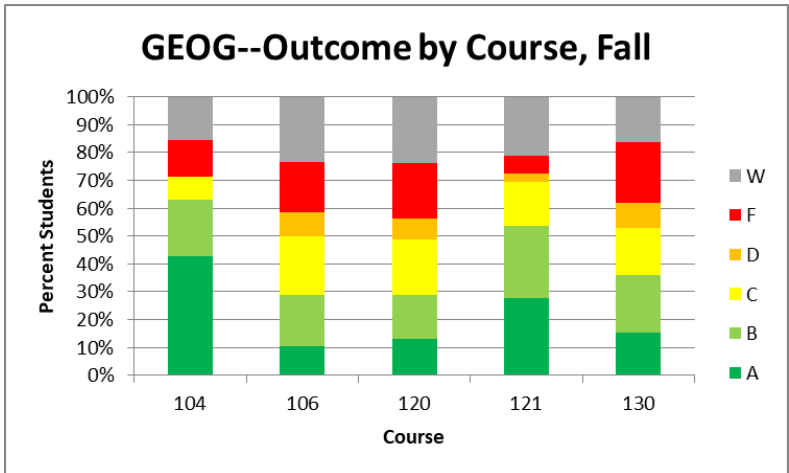
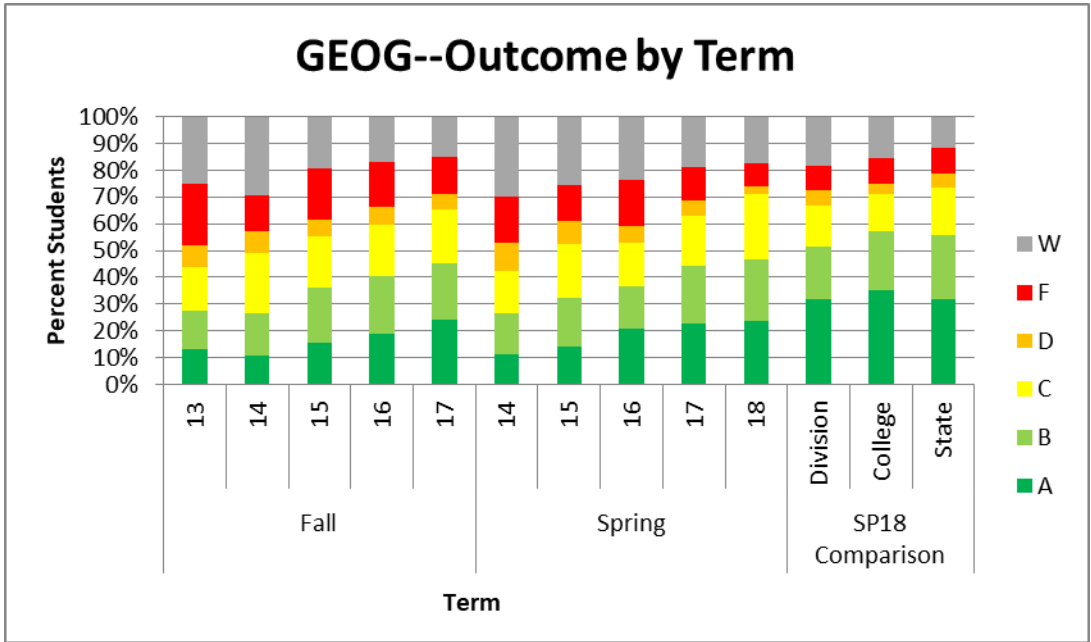
APPENDICES

Appendix 1. Grade Distribution Summaries

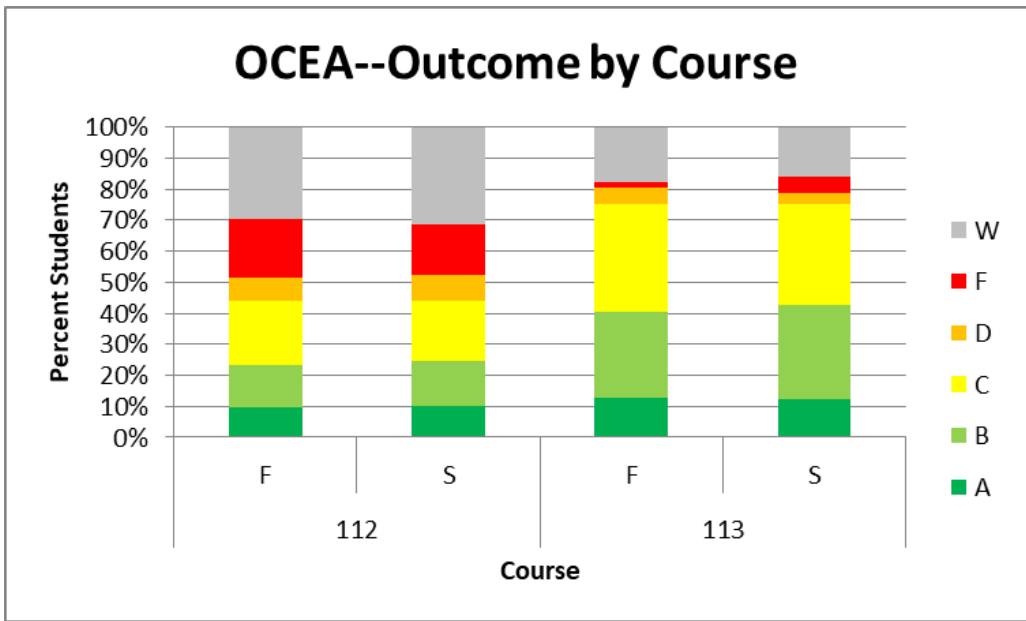
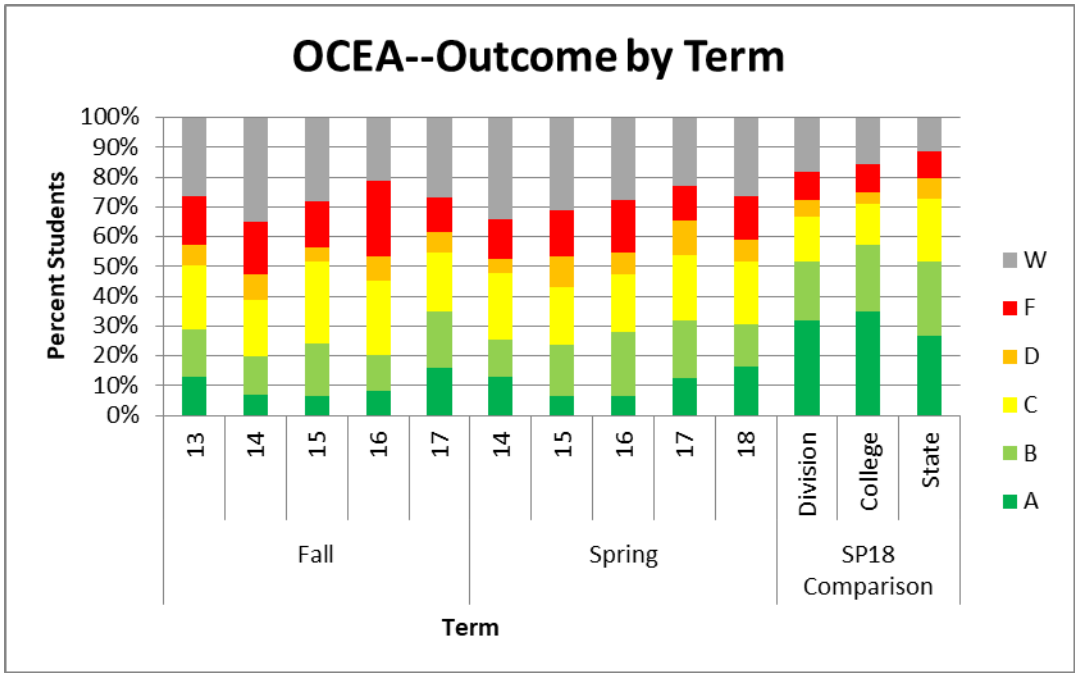
Geology



Geography



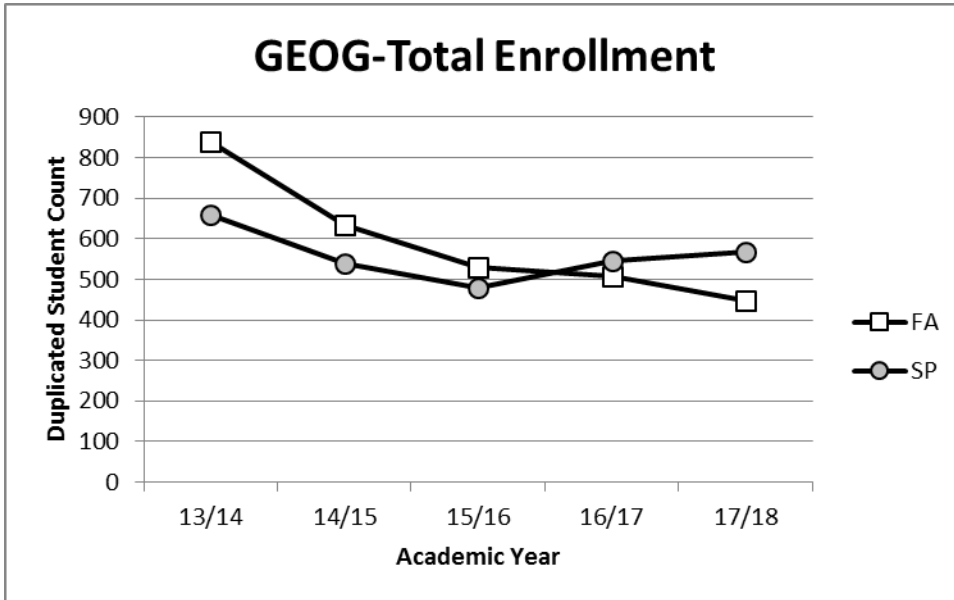
Oceanography



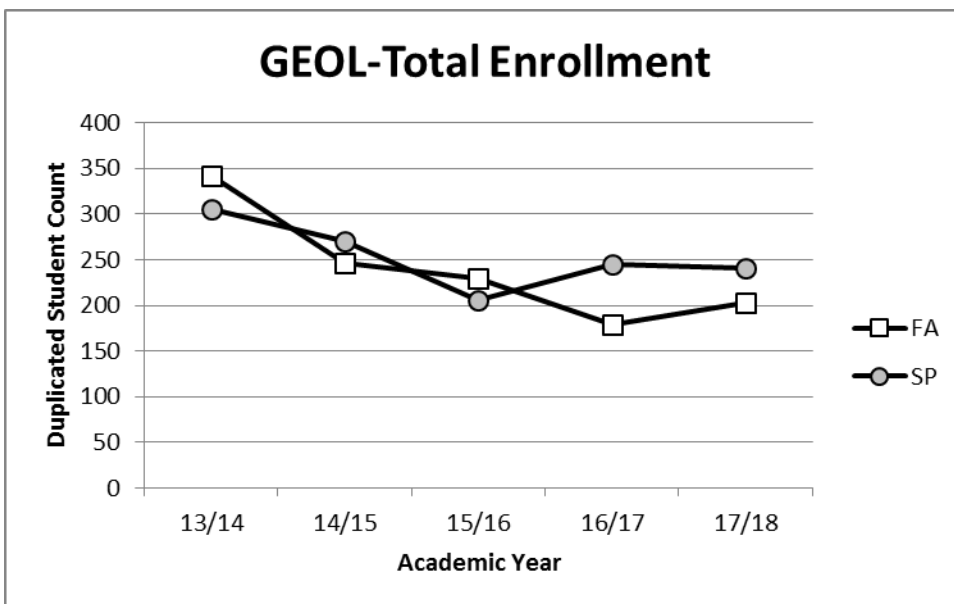
Appendix 2. Enrollment Data

Total Enrollment

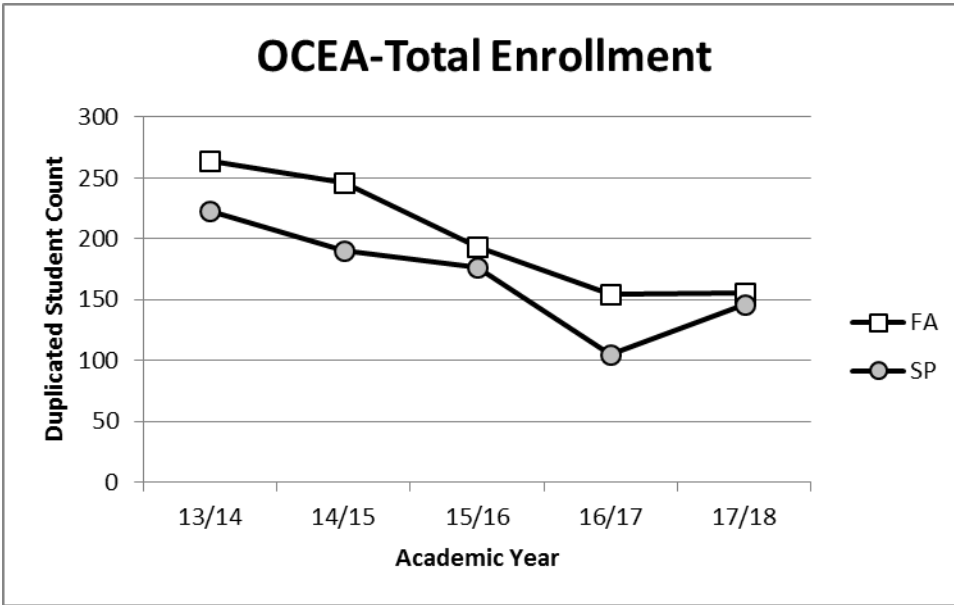
Geography



Geology

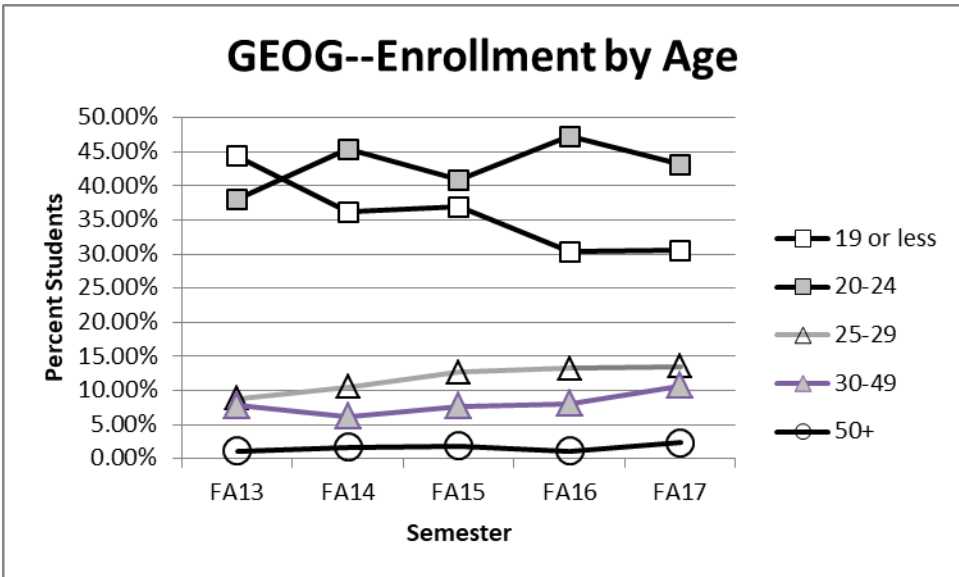
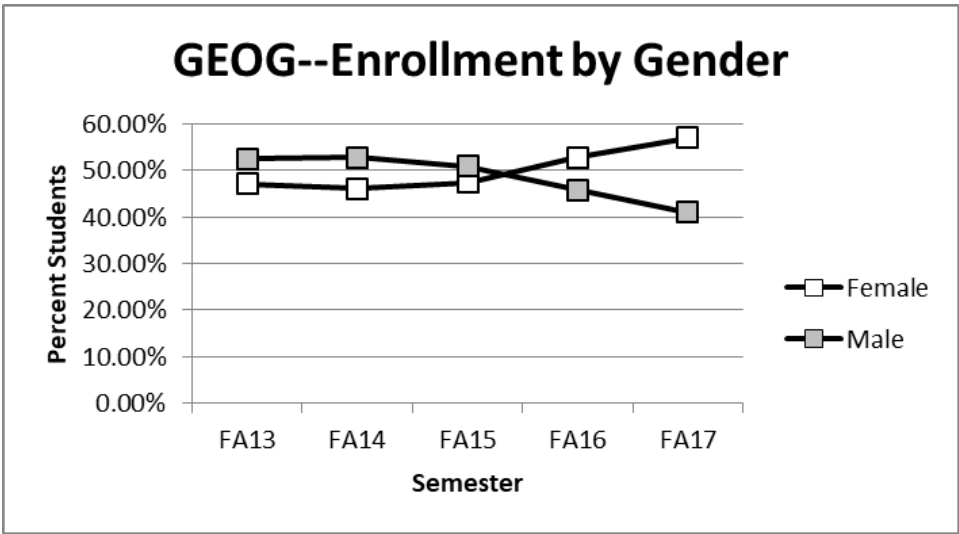


Oceanography

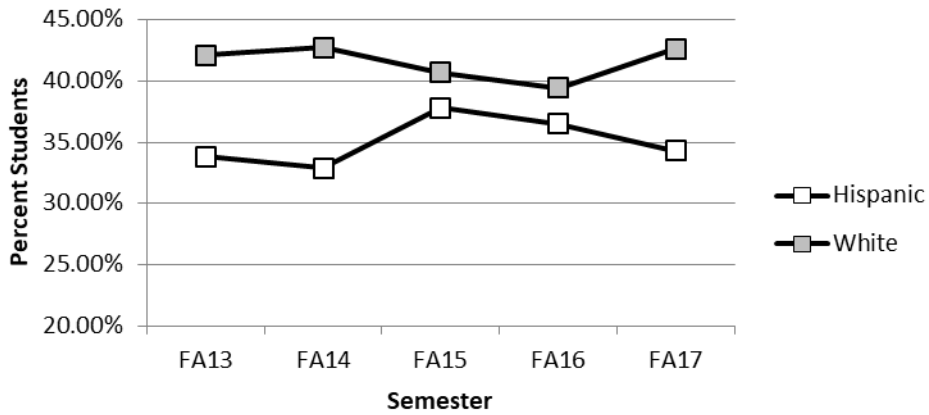


Disaggregated Enrollment Data

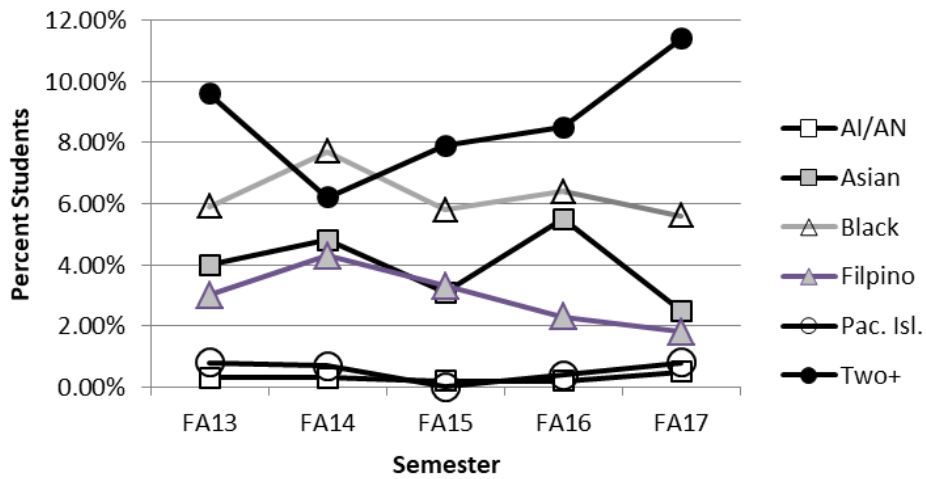
Geography



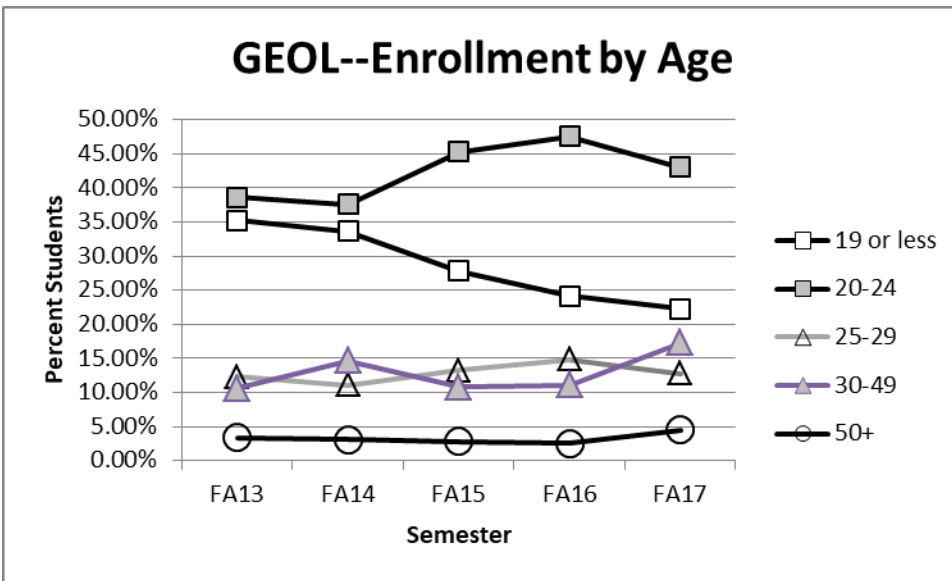
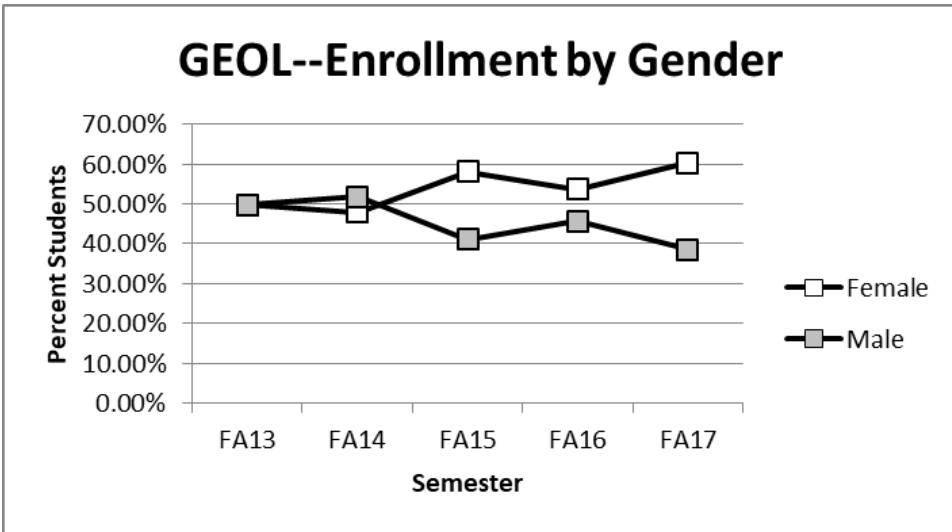
GEOG--Enrollment by Ethnicity, Hispanic & White



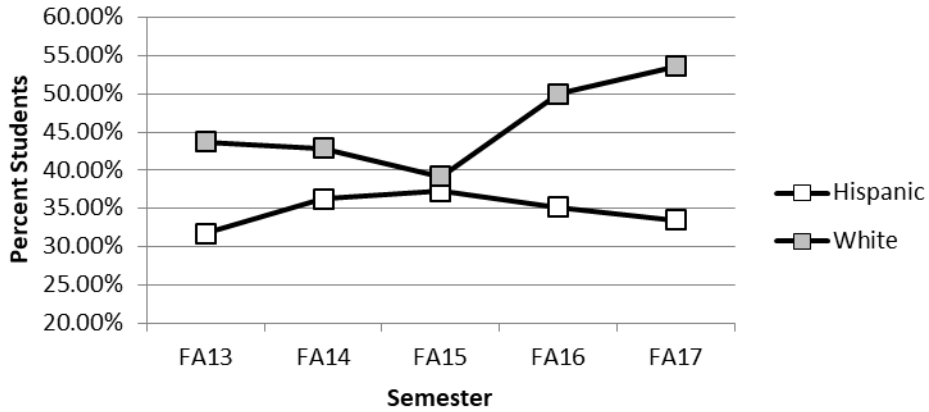
GEOG--Enrollment by Ethnicity, Other



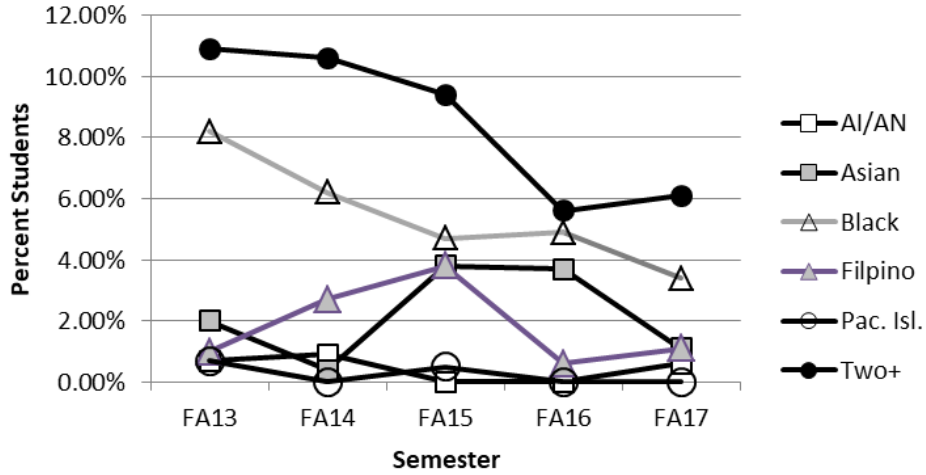
Geology



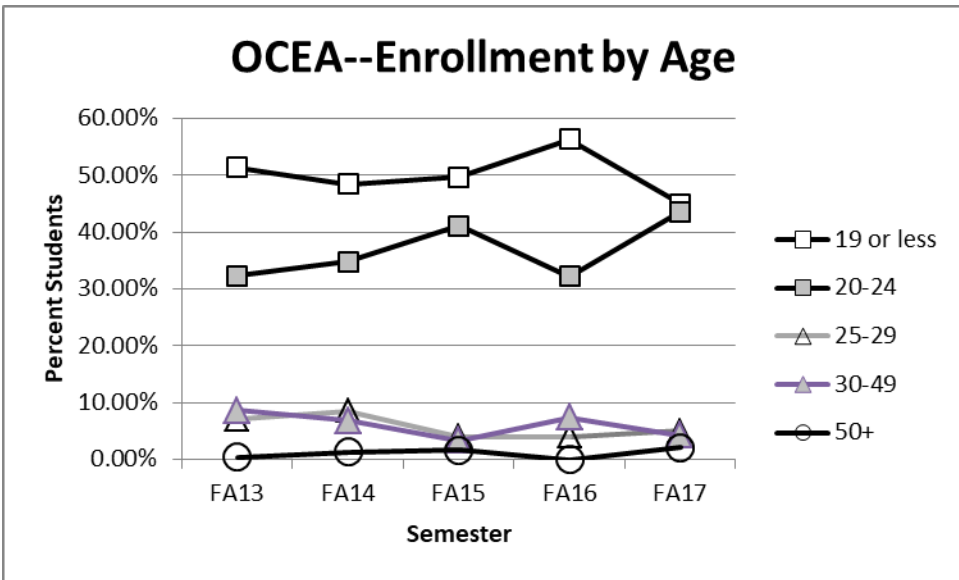
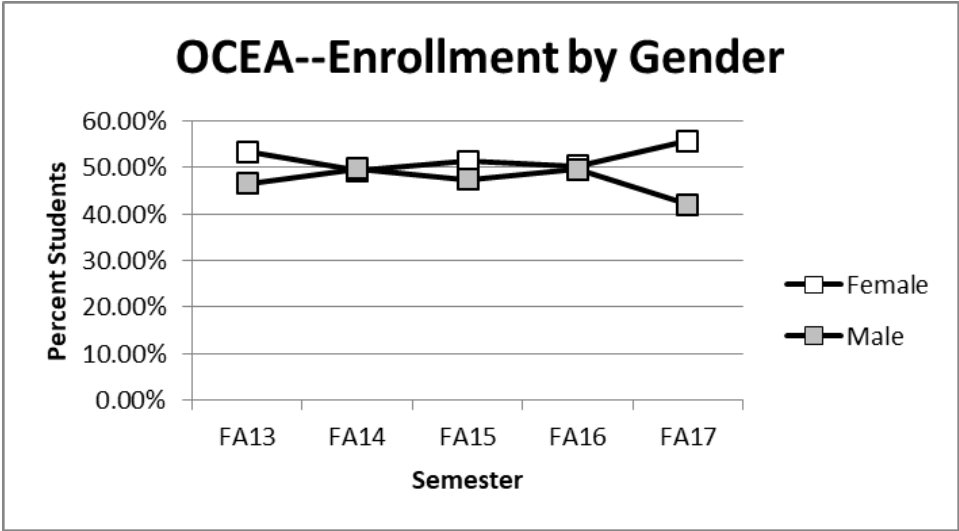
GEOL--Enrollment by Ethnicity, Hispanic & White



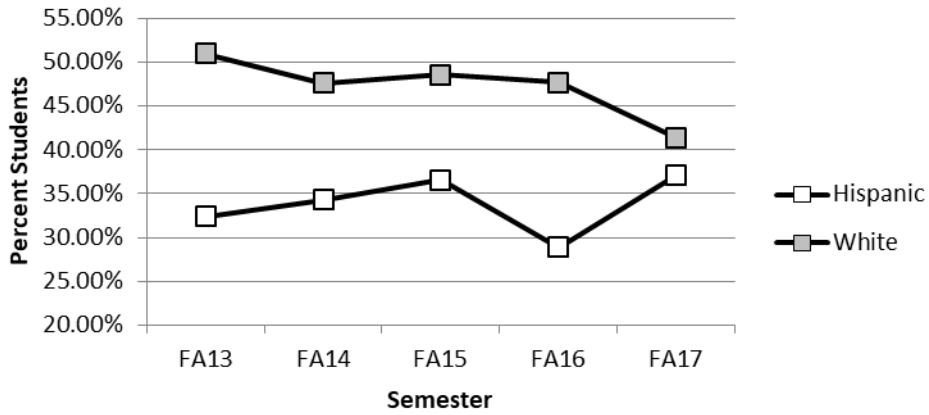
GEOL--Enrollment by Ethnicity, Other



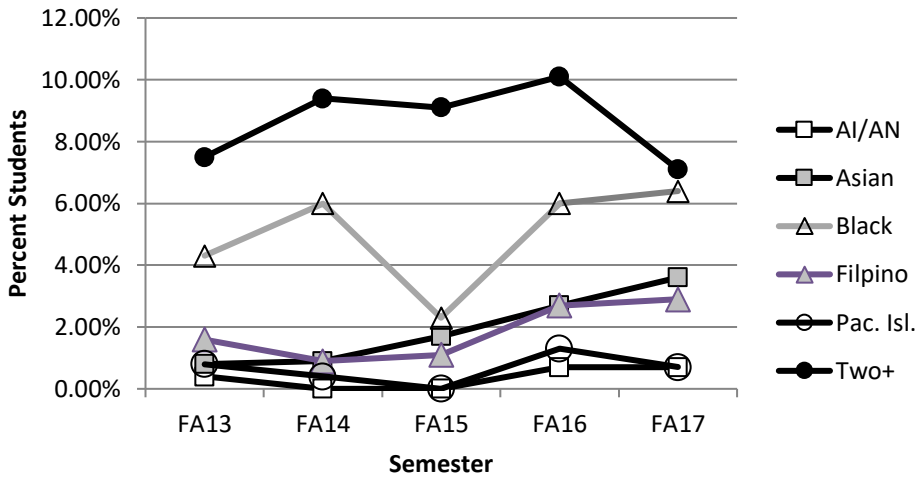
Oceanography



OCEA--Enrollment by Ethnicity, Hispanic & White



OCEA--Enrollment by Ethnicity, Other



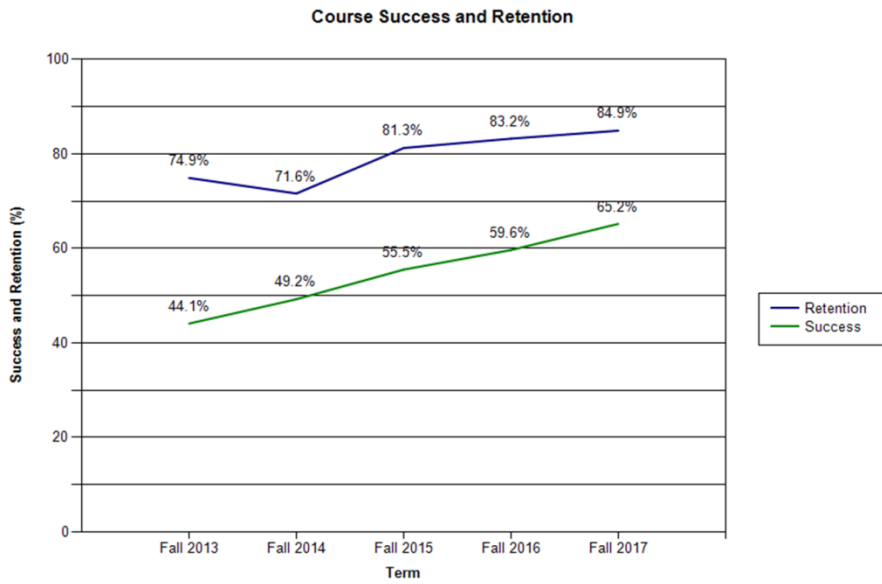
Appendix 3. Student Retention and Success Data

College 5-YR Averages: Success 69% and Retention 84%

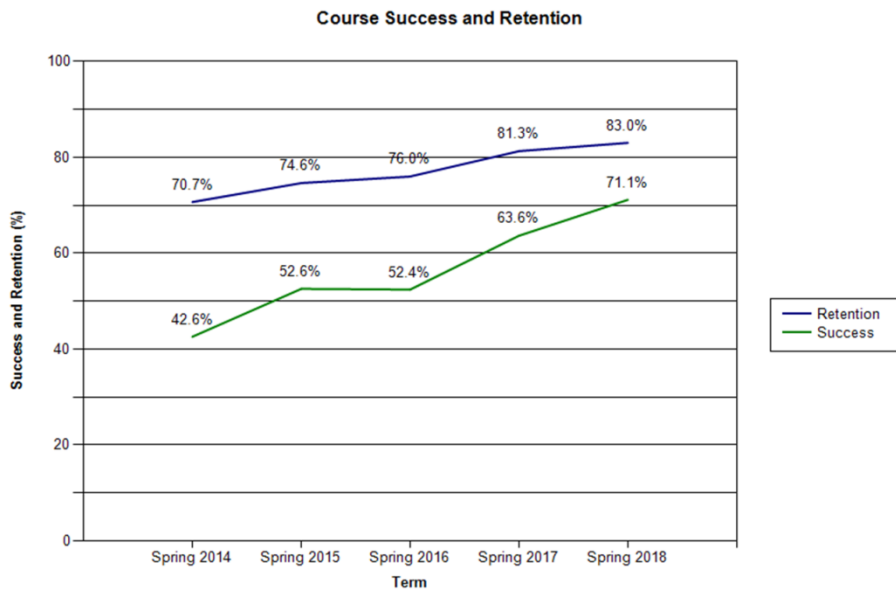
College Targets: Success 75% and Retention 85%

Geography

All Students: Fall

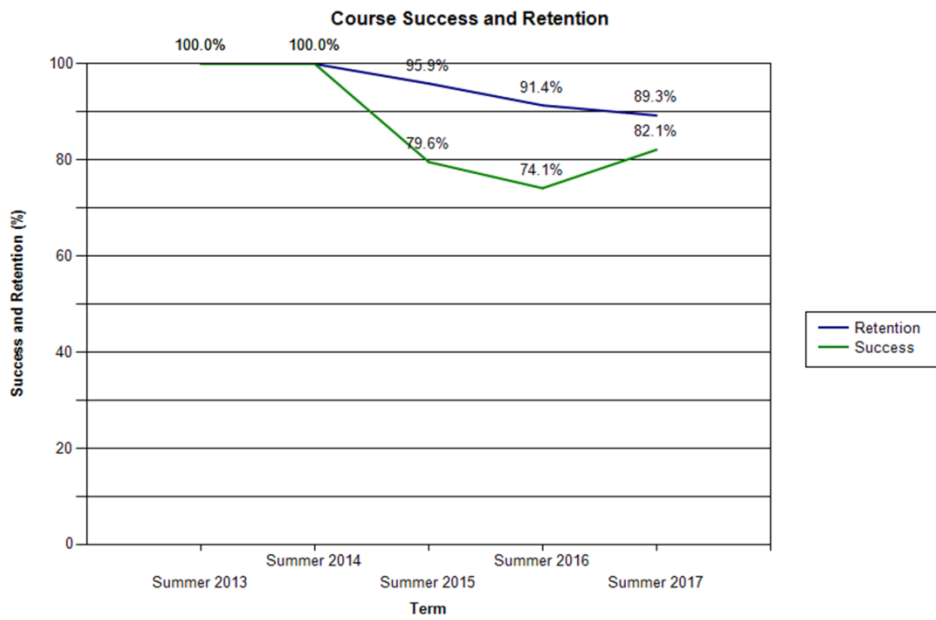


All Students: Spring



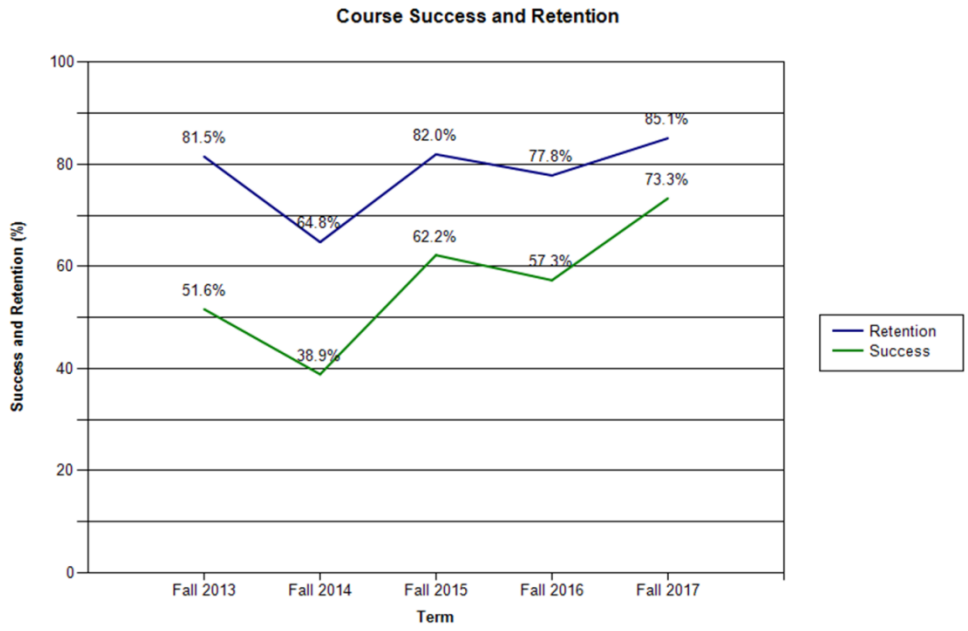
Geography

All Students: Summer

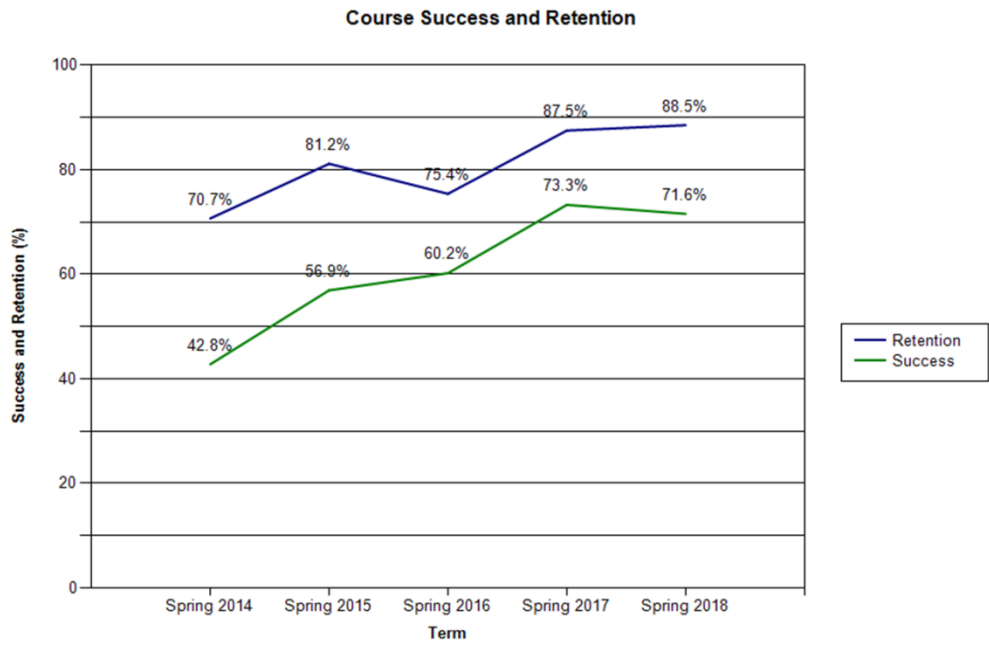


Geology

All Students: Fall

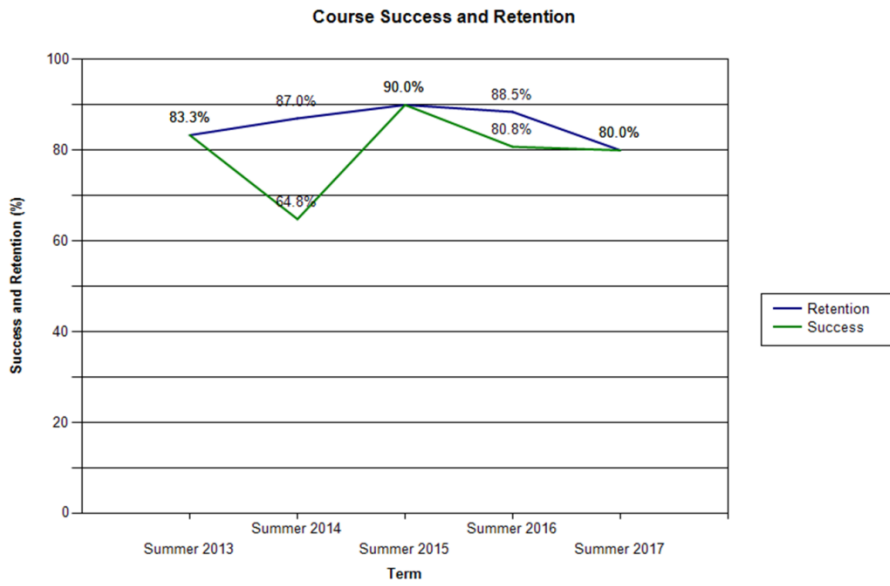


All Students: Spring



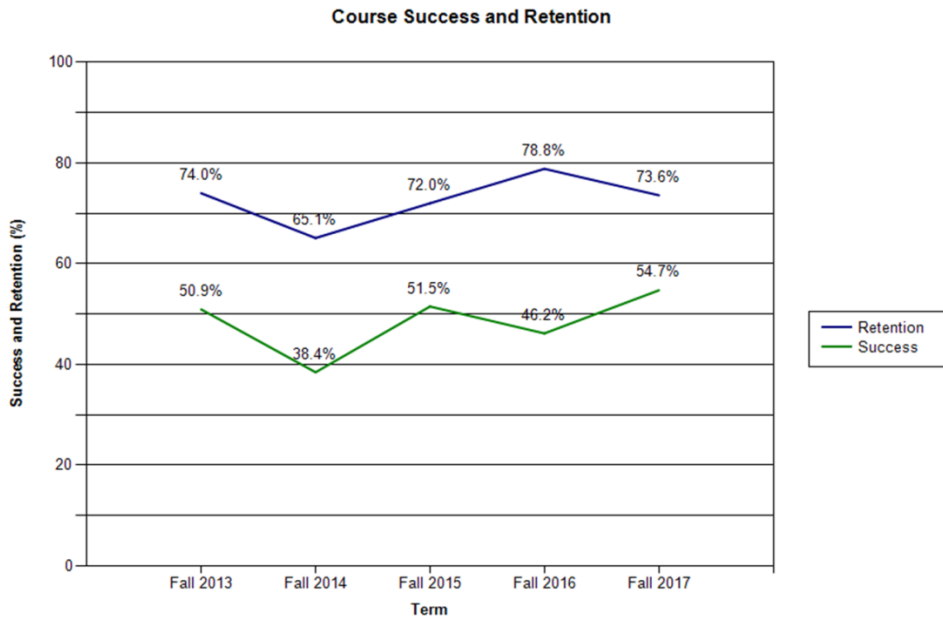
Geology

All Students: Summer

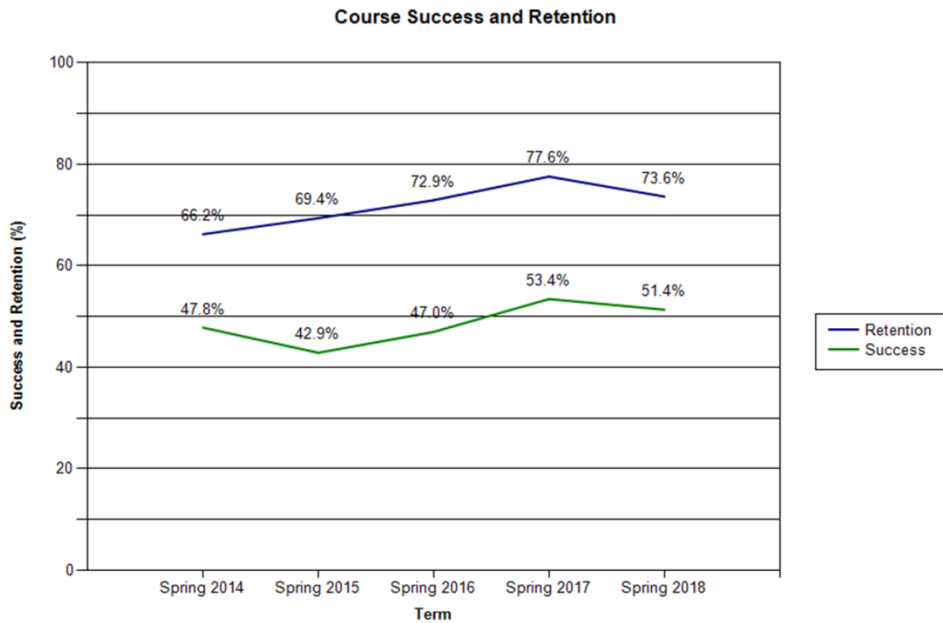


Oceanography

All Students: Fall

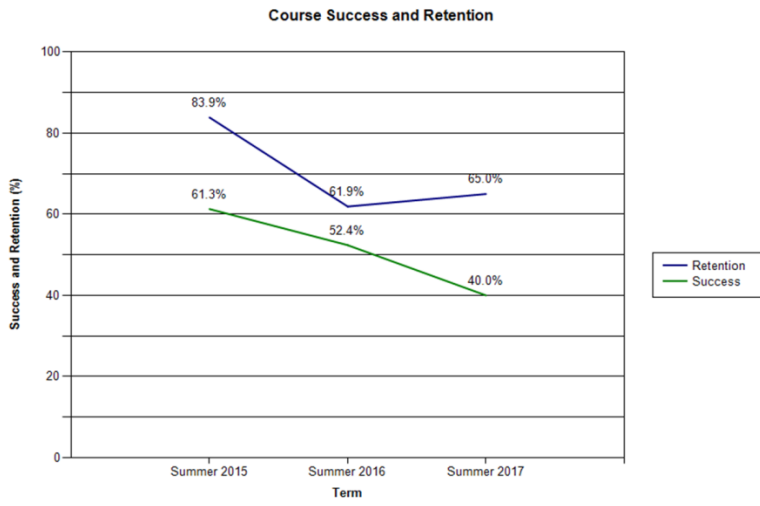


All Students: Spring



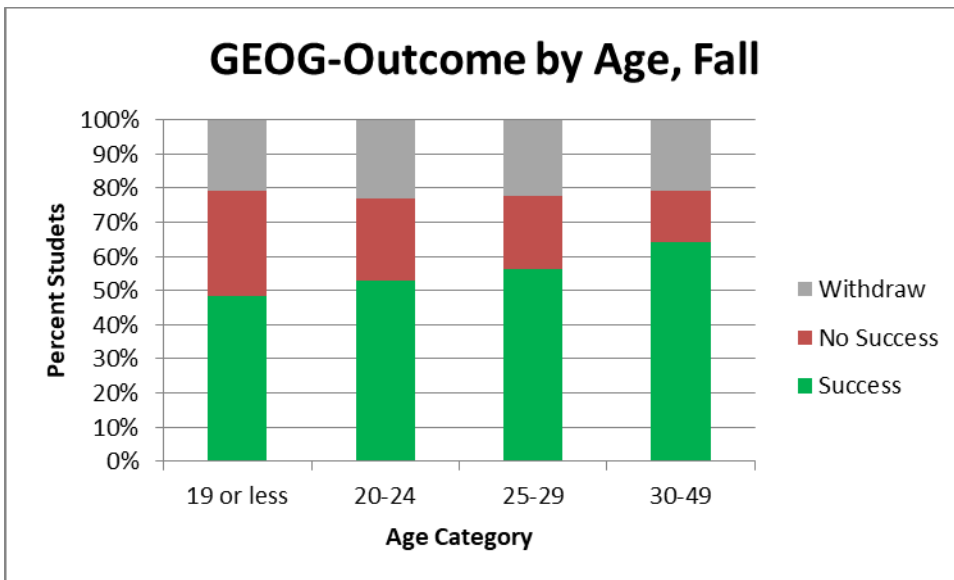
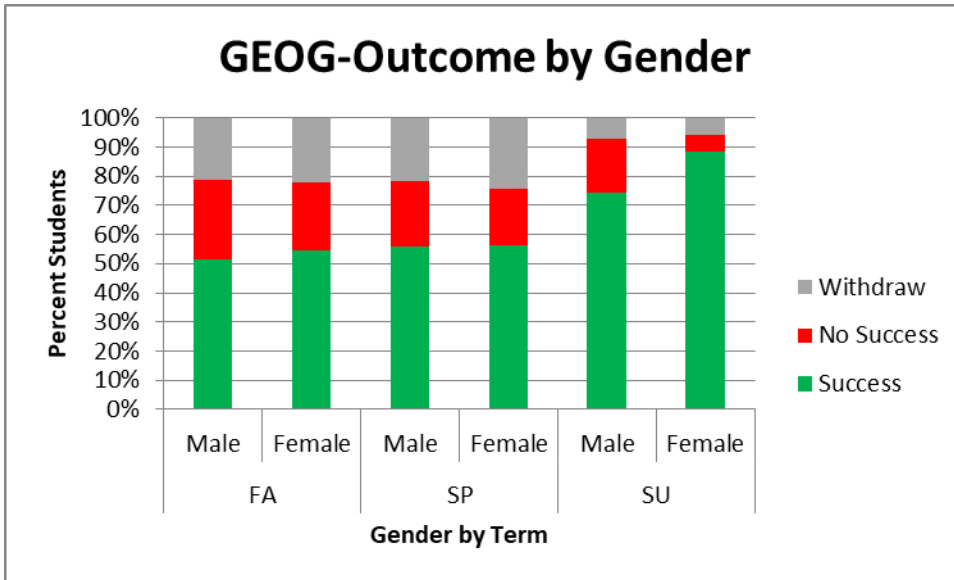
Oceanography

All Students: Summer



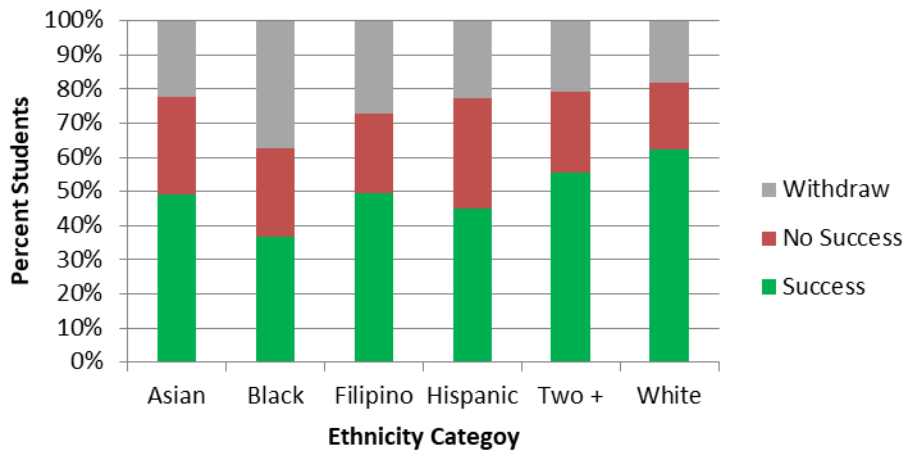
Student Success & Retention, Disaggregated

Geography



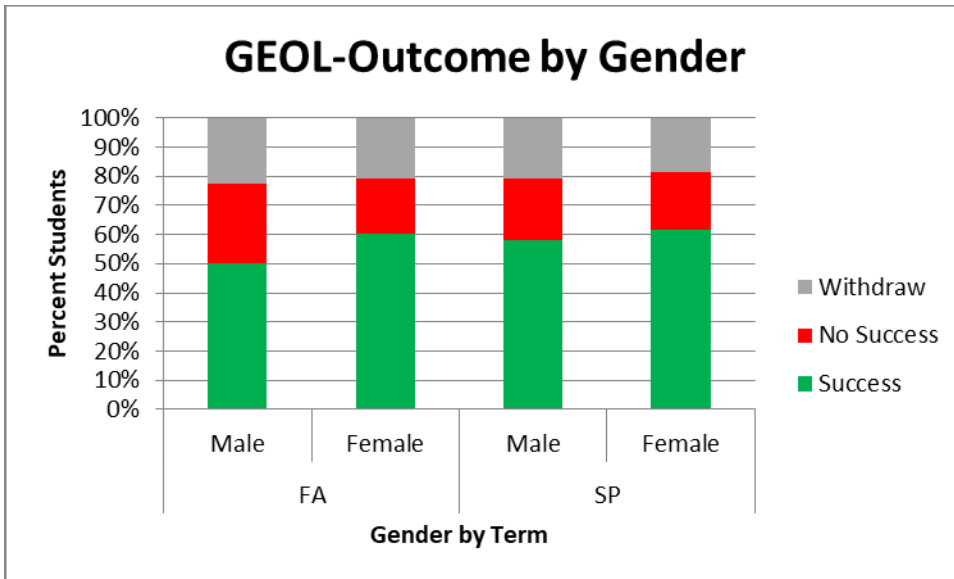
The sample size for 50+ age category is too small to show on graph. Data for spring show the same pattern, so are not included.

GEOG--Outcome by Ethnicity, Fall

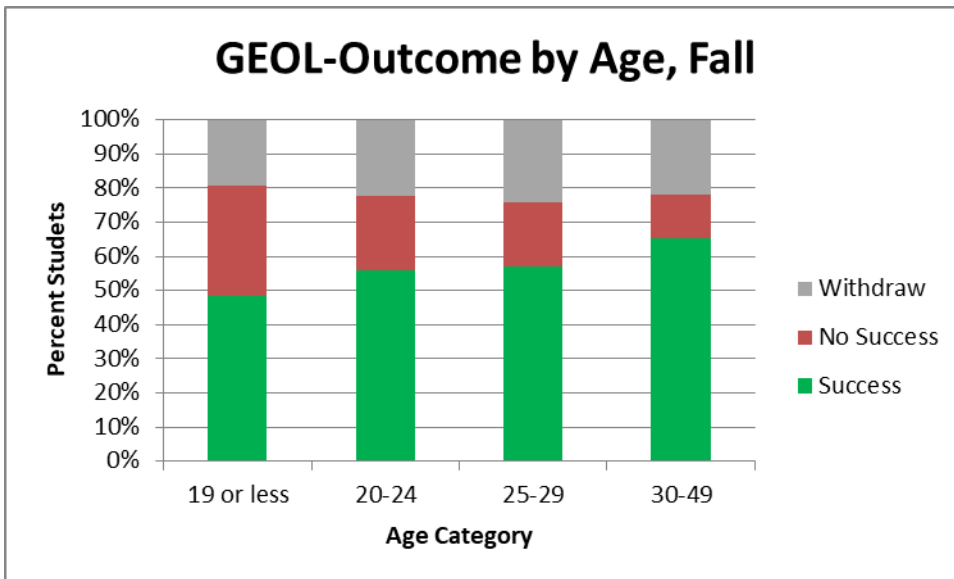


American Indian/Alaska Native and Pacific Islander are not shown since sample size is too small. Data for spring show the same pattern, so are not included.

Geology

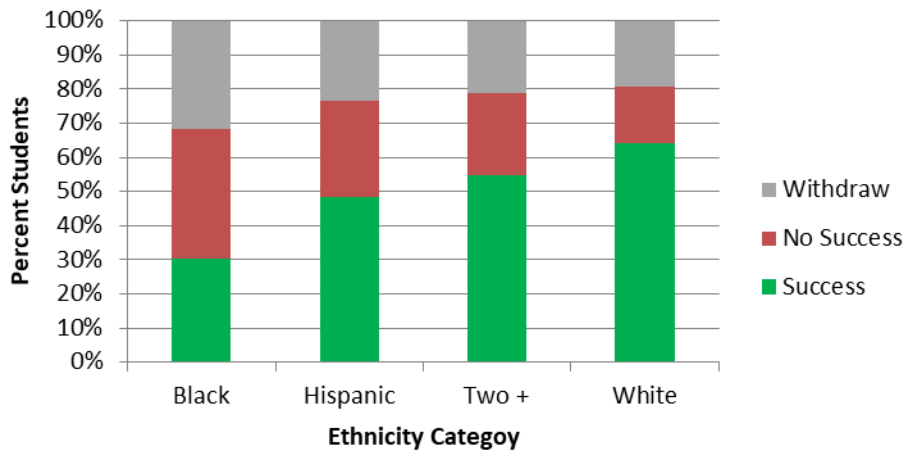


There are too few students in summer terms to show data.



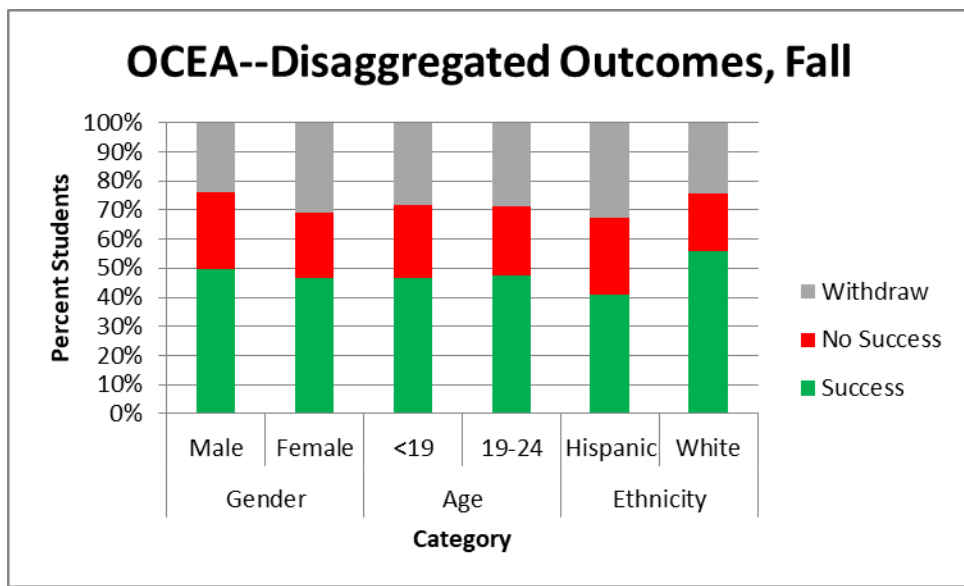
The sample size for 50+ age category is too small to show on graph. Data for spring show the same pattern, so are not included.

GEOL--Outcome by Ethnicity, Fall



Asian, Filipino, American Indian/Alaska Native and Pacific Islander are not shown since sample size is too small. Data for spring show the same pattern, so are not included.

Oceanography



Sample sizes are too small to show outcomes in any other categories or in summer. Data for spring show the same pattern, so are not included.

3. Student Success Data
4. Checklist Documentation (SLO, Instructional Operations, Articulation Officer, Library)
5. Answer to committee follow up questions. This step is completed *after* the committee reads your report. Add your answers to the digital copy of your report, and email a digital copy to the Program Review Chair.

Appendix 4. Checklist Documentation

Appendix 4.1 Student Learning Outcomes

Review of SLO Assessment Reporting for Political Science Fall 2018 Program Review By Joan Ahrens, SLO Coordinator 10/8/18 SLO Assessment Cycles to be Included in This Report: § Fall 2009 – Spring 2015 (Trac Dat will only have assessment results from 2012 on)* § Fall 2015 – Spring 2021 (All assessment results should be in Trac Dat up through at least Fall 2017) § I realize that 199 and 299 courses are offered infrequently, so there may not be assessments recorded if the courses are not offered. TD = Trac Dat POSC Information For program review, I check to make sure that the previous cycle’s results were recorded, and I check to make sure that the current cycle is up to date (see note above*).

Appendix 4.2 Official Course Outlines

GEOG 104: Introduction to Geographic Information Science (GIS)
 GEOG 120: Elements of Physical Geography

Approved 17APR07
 Approved 20MAY08

Appendix 4.3 Articulation

Date: November 8th, 2019

To: Mark Goodman and John Fitzgerald, Department Faculty

From: M. Denise Aceves, Articulation Officer

Re: Geography, Geology & Oceanography • Program Review Checklist

The process of articulation is two-fold. First, transferability must be established. A transferable course is one that is taken at a community college and can be used for unit credit at a university. The next step, is the articulation of courses deemed transferrable. Articulation is the formal, written agreement that identifies courses on a “sending” campus that are comparable or acceptable in lieu of specific course requirements at a “receiving” campus. Thus, articulation identifies courses that a student should take at community college to meet university degree requirements.

In response to your request for articulation information, Earth Science courses at Grossmont College are well-articulated. All formal articulation with our 4-year public education partners can be found at *ASSIST.org*, which is the public articulation repository available to current and potential college students. Please note that ASSIST.org currently may only reflect articulation information through 2016-2017 and partially updated information.

The large majority of theory courses in these disciplines are transferrable to both CSU and UC Systems, with the exception of Field Exploration or Field Studies courses only being transferrable to the CSU. Furthermore, courses in these disciplines have been evaluated by the CSU and UC systems to meet requirements for general education. As a result, approved Earth Science courses assist students in meeting CSU General Education Breadth requirements in the area of Scientific Inquiry and Quantitative Reasoning and Social Sciences. Similarly, there are approved Earth Science courses in the Physical and Biological Sciences and Social and Behavioral Sciences areas of IGETC. All courses that have received transferability and general education designations are notated as such at the end of each course description in the Grossmont College Catalog. The courses with course to course articulation by department with specific CSUs and UCs can be found on *ASSIST.org*.

Locally, our public 4-year educational partners include: San Diego State University (SDSU), California State University San Marcos (CSUSM) and the University of California, San Diego (UCSD). Articulation with the corresponding departments are robust and Grossmont College’s Earth Science courses have attained course to course articulations. **Once ASSIST is fully operational, the department is encouraged to review their course to course articulations on ASSIST.org and work with me, the Articulation Officer, to correct any inconsistencies as well as to develop new articulations.**

The Earth Sciences Department has also successfully offered the following Associate Degrees for Transfer in compliance with Senate Bill 1440:

- Geography AA-T, 16-17
- Geology AS-T, 13-14
- Global Studies AA-T, 19-20

To this end, the Earth Sciences Department has worked collaboratively with the Curriculum Committee, Instructional Operations and the Articulation Officer to establish the ADTs. Similarly, the department has been responsive to Course Identification (C-ID) required for courses in the degree.

Articulation is facilitated with current, concise and thorough course outlines. It is imperative that the outlines and text books listed be current. The requirement that course outlines be updated every 5 years through the Grossmont College Curriculum process is vital. Students benefit from the many colleges and universities who have articulated our courses in Earth Science. Below I have listed the link to *The Course Outline of Record: A Curriculum Reference Guide Revisited*, a document adopted by the Academic Senate for California Community Colleges in Spring 2017, as well as the latest standards for CSU GE Breadth and IGETC.

Earth Sciences Department Program Review-Follow-up Questions

After reading each report the program review committee develops a list of follow-up questions. This allows us to get a deeper understanding of your department's operations and guides our commendations and recommendations for the next program review cycle (6 years). We have tried to make the questions clear and very specific to minimize the effort needed to answer them. Please have the answers to the questions below back to me by **email no later than April 13, 2020**.

Section/Page	Question	Response
1.2	Does your enrollment support a program designated technician?	<p>This is a difficult decision for which the department has not reached consensus.</p> <p>On one hand, we have seen what happens if we don't have a technician: Broken lab and field equipment does not get repaired or sent back to the vendor, it just ends up adding to an ever-growing pile of stored, but ultimately dysfunctional items. (Our current tech has yet to clear all the debris that accumulated during the year we were without a tech!) New equipment may be ordered, but when the responsibility for ordering supplies, scheduling vans, provisioning field trips, managing the budget and curating our vast collection of geologic specimens falls on instructors, it leaves them less time to prepare curriculum, participate in committee work, engage in community outreach, tutor students etc. As these instructor-level duties are generally given a higher priority than tech-level duties, many tech-level tasks inevitably "fall through the cracks", and the deferred maintenance on equipment and supplies and becomes a significant impediment to effective teaching.</p> <p>On the other hand, the current dire fiscal circumstances of the college, the fact that our lecture and lab courses have been drastically cut and that the field course job requirements for the tech position were not what the department requested, all support the notion that the college's limited resources could potentially be better utilized elsewhere. In the future, when circumstances are more favorable, we hope to return the department to the status which made a technician a fiscally responsible decision.</p>
2.1	Explain how "college-level" note taking is the "hallmark" of your department	<p>All our instructors strive to design lectures which facilitate note taking. The course outlines require that a huge amount of material is covered. This is not the kind of material that can reasonably be covered in group discussions or in-class, active learning activities. It is essential that instructors present the bulk of the content via lectures which encapsulate, organize and explain the material in a manner that students can get down in their notes. This means carefully planning out what to show on the whiteboard and/or via Power Point in a way that students can be engaged in notetaking. Notetaking is the way we engage our students in active learning.</p>

		<p>Our Field Classes have greatly transformed our understanding of how important student note taking is to <u>any</u> class that is seriously interested in "active" rather than "passive" education; we now treat note taking skills with almost as much importance as exams, pop quizzes, group assignments, topic exercises, and field work. That's because upon grading our required Field Notebooks, we found the tremendous lengths to which students would go <u>beyond</u> what they knew was advertised as being required as exam topics. Subsequently, our Field Final Exam has become an "open notebook" exam that produces a level of seriousness that we had never anticipated when we started our Field program.</p> <p>Thus, this same model came to dominate our Physical Geography Labs, with the result being a tangible change in "mere paper-pushing" on labs into the production of a final product that could then be used on more expansive exams. As online resources became increasingly available, then, this same model became a way to somewhat transform lecture classes into in-class exercises or group quizzes made possible by meaningful note taking. Now, with the explosion of student-owned scanners (smartphones and apps like CamScanner) and the success of our Online Lecture classes, note taking and the production of a student notebook has become a part of the grading rubric in our online lecture classes with a similar result as initially seen ten years ago in our Field Classes! In other words, we have maximized the "active" nature of online classes in a manner that minimizes the ability to "passively" just click boxes, or, to just "passively" stare into space or nod heads in agreement as is often the case in on-campus classes.</p>
2.3	<p>Describe how Tim Cliffe's "online lectures" are considered "a student engagement strategy"?</p> <p>What steps are you taking to ensure "that our courses are among the best on campus" are</p>	<p>This question is best answered by watching one of Tim's videos (see https://www.3cm mediasolutions.org/privid/181327?key=e192a2092a3f8e68118e5800407ecc6b8602d2ad). Student engagement happens much like it would in watching an episode of Bill Nye the Science Guy. Tim's enthusiasm, humor, quirkiness, brilliance, creativity, passion, production values and skills in explaining complex topics all combine to captivate viewer attention.</p> <p>We try to engage students from several different backgrounds in our classes, keeping equity in mind. We keep student costs at a minimum by having no textbook requirement. We also conduct field trips that have no additional cost to students. Some of these students have never had opportunities to camp, hike, or see various forms of nature, and greatly appreciate the opportunity.</p>

<p>marketed to all students?</p> <p>What activities do your faculty participate in in the community and how does that lead to student engagement?</p> <p>Who is telling students that Cultural Geo is not about Cultural Competence?</p> <p>Would the department consider updating the course description?</p>	<p>Department members participate in a broad spectrum of outdoor activities which provide direct interaction with the environmental concepts we teach. In addition to volunteer work at local schools sharing discipline expertise, department members are also involved with the areas native plant societies and parks and volunteer with community planning boards and town councils. Being able to share personal experiences and activities which relate directly to the course content and which students may themselves be interested in, makes the content relevant to students.</p> <p>Judd Curran has been active in Climate education at the community level in the City of San Diego. This has greatly aided other department faculty whenever a student asks for help on a Climate related project in a DIFFERENT class (even if at a new college!), all of us go straight to Judd and get his well-prepared resources and powerpoints (and personal communications) to provide to that student!</p> <p>Judd's connections to Professor Ming in SDSU's GIS program has lead to great student connectivity to that prolific program, besides the numerous students subsequently hired into local GIS jobs because of Judd's connection to former students now employed in GIS.</p> <p>Tim Cliffe has recently done presentations at Mission Trails Regional Park for the MTRP Docent Program, and through the last several years, we have gained students from these docents OR had students enter into their Docent Program. In fact, one of Tim's former students is now the Head Ranger at MTRP. Same with the head hydrographer of the CA Water Science Center, or the head of the USGS Poway Field Office, or a Senior Forecaster of the National Weather Service Los Angeles Office. Etc. These connections give Tim's students real life examples of the topics we cover, and, real life contacts for occasional job opportunities. Also, Tim's 30 years of volunteering with the East County Interfaith Shelter several days per year has been slightly increased by the monthly Welcome Saturday program that his wife runs in East County once per month. (<i>So again, if you have extra clothes (especially for men), please drop them by the Earth Science Office so we can get them to where they're needed.</i>) These activities keep him grounded with some of the most successful and some of the most destitute in our community.</p> <p>When courses which offer similar educational concepts are exclusively promoted, encouraged, stressed and required it implicitly leads students to believe there is only one method of achieving certain educational goals. Since the college has increased an emphasis on cultural competency, we have made repeated attempts to engage and encourage administration to recognize Cultural Geography as a class</p>
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		<p>which fulfills cultural competency education goals and requirements. Unfortunately, any perusal of promotional material which advertises cultural competency options to students continues to lack Cultural Geography as an option.</p> <p>Yes the department would consider updating the course description and even began working on a “cultural competency” certificate for the course similar the single course certificate offered by cross-cultural studies but upon further reflection considered this a simple marketing ploy that would not be helpful to students in the end.</p>
2.4	<p>How do part-time faculty benefit from full-time faculty' experience? Please provide examples.</p>	<p>Many of the part-time faculty and full-time faculty meet and converse in the Earth Science workroom. Part-time faculty ask questions about teaching, which full-time faculty do their best to answer. Part-time faculty also sit in on full-time faculty classes to see how full-time teachers conduct their classes.</p> <p>Below is a statement for one of our adjuncts that moved-on to teaching full time at Angelo State University:</p> <p>How do part-time faculty benefit from the full-time faculty experience? Please provide examples.</p> <p>My time as an adjunct instructor at Grossmont College remains to be one of the greatest experiences of my professional life. Although there are many reasons as to why this is the case (wonderful students, fun lectures, eye-opening Earth Science field trips, etc), all considerations can be condensed to one explanation: the full-time faculty that compose the Department of Earth Sciences at Grossmont College are like no other.</p>

I worked for the Department of Earth Sciences from August 2014 to December 2016 teaching Physical Geography, but also took part in professional development opportunities simply by knowing my full-time faculty members: Tim Cliffe, Judd Curran, Mark Goodman, Scott Therkalsen, and Gary Jacobson. Any discussion ever had by one of these faculty members was either insightful, or funny and insightful (they were all dedicated professors with a great sense of humor; I know the students appreciated that). As a new adjunct, I admired this team for always being so welcoming and helpful. Since I aimed to be the finest educator for my students, I maintained close professional relationships with my senior colleagues so that I could learn from them and continue to increase my knowledge in my field. During my last couple of semesters of teaching I played the part of a student by enrolling in courses at Grossmont College, which permitted me to gain substantial knowledge in specific areas of instruction such as California Geography and Geographic Information Systems (GIS). In addition to reinforcing my skills in the classroom, I also took part in many field courses which included: California Coastal Mountains, Cascade Range/Modoc Plateau, and Natural History of the Greater San Diego Region, all of which were amazing trips that provided me with excellent laboratory practice, field experience, and comradery with the full-time faculty members who welcomed my growth as an adjunct instructor.

I am currently a full-time faculty member at Angelo State University and have been away from California for a few years now, but my experience with this specific group of people has helped shape me into the educator I am today and so my appreciation remains. With that said, if you stop by for a visit you will see my office door covered in photos from past Earth Science excursions, many of which took place with the good folks over at Grossmont College.

Thanks for everything guys, miss y'all mucho!



Jessica A. Garza, M.S.

Instructor, Department of Physics and Geosciences
Angelo State University
Member, Texas Tech University System
ASU Station #10904



	<p>How did you determine what to include in the “foundational core elements”?</p>	<p>San Angelo, TX 76909-0904 Phone: 325-486-6987 Office: VIN 130 rza85@angelo.edu</p> <p>And here is a statement from one of our current adjunct instructors:</p> <p>As a third semester adjunct, I am humbled and thankful for the wisdom, guidance, and tools provided to me by the full-time Earth Science Faculty. When I was brought into the department, I was completing graduate school at San Diego State University, and had limited experience teaching as the sole instructor. Knowing this, the Faculty facilitated conversation as to the best pedagogical strategies to employ for various classes, provided class material, and met with me regularly to discuss any questions I may have had. They are consistent mentors and go above and beyond to assist me as I progress in my career. I was one of their students while I attended Grossmont College, and I am still learning from them to this day. --Kristen Monteverde</p> <p>Foundational core elements were largely determined by the collective experience of numerous department instructors across several decades of teaching. In teaching the material over several years and in discussions with many colleagues, both in-house and in the larger community of geoscientists, certain concepts emerge as essential—without which it is impossible to understand a broader spectrum of phenomena. Thoroughly understanding and being able to apply a few fundamental principles, (e.g. potential vs. kinetic energy, the laws of thermodynamics, feedback loops etc.) opens the door to understanding concepts we may not even have time to cover in our classes. What we strive to do in our physical science classes, is apply fundamental principles of science to Earth systems.</p>
2.5	<p>What facts do you have the cause you to state students are “simply not prepared for a college-level course”?</p>	<p>Several students have commented, “they’re afraid of science classes” or “they’re horrible at science and math”. They did not attain a basic understanding of physical science, biology, math, or chemistry in high school, which puts them at disadvantage for an entry-level college science class. The Earth Sciences include physics, math, chemistry, and biology. At the start of each semester, multiple department members ask students to provide background information on themselves including their recent and relevant science educational experience. Most students note that they have not had any real science course in high school or that they feel their science courses have not prepared them for college science.</p>

4.3	What reason were you given for the lack of facilities that you had requested?	We were not given any reason. We were just told that that's the way it is going to be. On a positive note, proper space for Geog104 has been resolved.
5.1	What facts do you have that support the statement that "younger students are increasingly being counseled into taking chemistry or physics rather than the Earth Sciences;"?	The evidence is anecdotal, circumstantial and theoretical. After students were required to have ed-plans, we started hearing from some students that they were explicitly counseled <u>not</u> to take Earth Science classes. Such reports were never encountered before statewide initiatives were enacted to limit the number of extraneous units students take in pursuing a degree. Simultaneously, the number of chemistry sections increased dramatically, while Earth Science sections were being cut. It is doubtful that, during the period of just a couple semesters, student sentiment could shift so dramatically that suddenly chemistry was more appealing than the Earth Sciences, without getting significant influence from counseling.
5.3	Please explain the "greatly increased faculty workload" relative to Flipped Classroom	Since our courses are lecture-heavy, flipping means developing out-of-class activities that can reasonably substitute for content presented in lecture. In the wake of the Covid-19 quarantine we now have real-time confirmation as to just how much time that takes. Our instructors have been routinely putting-in 12-14 hour days of late generating high quality content such as video lectures.
5.6	Please provide the grid or table that includes the number of degrees and certificates awarded for your departments	We have requested this information from Wayne Branker but we are still waiting for him to reply.
5.7	To what do you attribute the numerous student success	This letter from a former student, and now one of our adjunct instructors, is a representative of the experience many of our students have and indicates some of the reasons why our students achieve success beyond Grossmont College:

	<p>stories you shared?</p>	<p style="text-align: right;">Dr. Nabil Abu-Ghazaleh President Grossmont College 8800 Grossmont College Dr. El Cajon, California 92020</p> <p>Dear President Nabil Abu-Ghazaleh: My name is Kristen Monteverde and I am a proud Alumni of Grossmont Community College. I currently attend San Diego State University where I am pursuing a bachelor's degree in Geography, and a minor in Geology. Having just completed my first year at SDSU, I would like to share a few words of gratitude that have been on my mind these past few months. I began attending Grossmont College in the fall of 2008, unsure of which path I would ultimately pursue in regard to my education. I am thankful for the requirements which led me to the Earth Sciences department at Grossmont College. It was my first encounter with a department where I felt truly encouraged to embrace my education by developing it into more than just a grade on paper. The professors challenged me to excel and provided me with tangible resources to do so. I would like to make it known, that if it wasn't for the support of this department, I would most likely not be at SDSU. During this past year at university, I have only grown in appreciation for the education I received at Grossmont College. The level of material being presented to the students of Grossmont is far above the education my peers received at various local community colleges. I thank specifically Scott Therkalsen, Judd Curran, Tim Cliffe and Mark Goodman for the quality of education I received while attending their courses. It helped me have a great start at SDSU. Making the Dean's List this past fall and soon to be spring as well, along with becoming the Undergraduate Representative for the Geography Department are perfect examples of how their support has helped me beyond what is required of them. I hope to not only thank them for their continued efforts on behalf of their current students but recognize them for the great things they have done in the lives of their former students. I aspire to teach like them someday and I am so grateful to have had such wonderful examples. Thank you for your time, and welcome to Grossmont College. Sincerely, <i>Kristen M. Monteverde</i> Kristen Monteverde 9367 Manor Dr. La Mesa, CA 91942 619) 517-4397 monteverdekristen@gma</p>
<p>6.1</p>	<p>Tell us more about the loss of Geo-Con. Why do you think this was discontinued?</p>	<p>The disability leave of Renee Tuller, and her tremendous work ethic, knowledge, and connection to the support monies (required for all of the thorough pre-work that was being done before bringing Counselors into our classroom), was <u>the</u> critical reason that stopped the incredible output of this program in producing Ed Plans and happy students! Our hope is that now Renee Tuller is returning healthy to Counseling, she will be afforded the time and resources to lead this spectacular program! Here's an overview of the way Renee has utilized Earth Science faculty into becoming champions for student</p>

		<p>planning, as accessed from the State's 3CMedia website: https://www.3cm mediasolutions.org/user/4855/video/task/165595?mode=detail</p>
6.2	Are your peer (student) tutors paid? If so, how is this funded?	Yes. Through the Grossmont tutoring center.
6.3	Is it necessary for all students to be provided laptops for online activities in every class?	No.
7.0	Can Mark Goodman tell us more about the Thailand and Cambodia exploration?	<p>Geography involves the study of place. In order to more fully understand physical and cultural systems, their interactions and interdependencies, and to be able to intelligently analyze their relationships requires a geography professor to spend time in the field. While it is fairly easy today to have on-the-ground experiences around the world, it is impossible to develop in-depth and intimate knowledge of all places spanning the globe. Since 2003 I have spent an extensive amount of time in the Southeast Asia region, with the vast majority of my time in Thailand and to a lesser degree in Cambodia. For the past 16 years during which I lived in, worked in, and travelled through Thailand and Cambodia at different times of the year, I have developed a deeper understanding of the cultures and environments of these states. Some specific examples of hands-on experiences during the past 6 years include the following.</p> <ol style="list-style-type: none"> 1. "Death Railway" constructed by Allied POWs and enslaved locals during WWII in Kanchanaburi, Thailand 2. Crocodile research facility in Samut Prakhan, Thailand 3. Numerous Chinese and Buddhist religious ceremonies in Bangkok 4. Thailand's Muslim insurgency-plagued southernmost provinces 5. Karst topography dominated islands of Vietnam's Ha Long Bay 6. The Killing Fields of Choeung Ek, Cambodia and the infamous Khmer Rouge prison facility (S-1) in Phnom Penh 7. Ancient 250-year capital of Oudong, Cambodia 8. Royal Thai army and air force bases

	<p>Tell us more about Gary Jacobson's Petra Forge sabbatical project and how it increased student engagement.</p> <p>In the Professional Development category, have any instructors from your department attended or contributed to conferences that concentrate on teaching</p>	<ol style="list-style-type: none"> 9. Royal Thai Naval Academy and cruise on Thai warship 10. Buddhism meditation retreat 11. Anti-government rally in Bangkok 12. Ayutthaya World Heritage Site 13. Chao Phraya River cruise 14. Trang Province island ecology 15. One of 12 million people who attended the lying-in-state of Thai King Rama IX at the Dusit Maha Prasat Throne Hall of the Grand Palace in Bangkok 16. Queen Saovabha Memorial Institute/Thai Red Cross Society (poisonous snake venom extraction) 17. Rama IX Botanical Gardens <p>PetraForge improved student success and engagement in classifying rocks and in explaining how rock-forming processes determine rock properties by developing browser-based, exploration-driven learning modules for each of the three rock families. In each module students select a rock from a list and then attempt to “make” it by choosing from an evolving set of geological processes which affect earth materials on their way to becoming rocks. Through sequential graphics and animations students see the result of their choices on both macro and microscopic scales, thus strengthening their grasp of cause and effect relationships. The project filled the need for meaningful and engaging assignments in petrology.</p> <p>Yes, Anne Teachout participated in the NSF-supported Active Learning Project (EAGER Grant) that worked on engaging and helping minority students succeed in the STEM classes and fields. Also, the geographers have participated in workshops and panels at the California Geographical Society's annual conference which focus explicitly on community college teaching and education including a focus on equity. Additionally, Scott Therkalsen attended a National Association of Geosciences Teachers workshop which focused on “Active learning in the geosciences” providing pedagogical tools available for immediate use in the classroom.</p>
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	<p>pedagogy and student success and equity in general, not necessarily related to Geology?</p>	
<p>7.3</p>	<p>What other flex week opportunities have your faculty attended, and what value have they had to your students (other than the field trips)?</p>	<p>Each semester department members attempt to attend any counseling workshops that are available to better understand the complicated demands and requirements of students. Unfortunately, recently the faculty professional development schedule has been drastically scaled back and rarely offers opportunities for workshops that can be immediately integrated into classroom curriculum and techniques (e.g. the workshop on middle eastern culture that was offered in the past does not qualify under current requirements).</p> <p>Tim Cliffe has been regularly active one year to the next with the Distance Learning activities offered through Staff Development. That especially started during the last year of Chris Rodger's tenure at Grossmont, when VPAA VanderWoude requested that we generate an online Physical Geography class. Subsequently, Janet Gelb invited Tim to present to other faculty at several Flex Week "Canvas Showcases" relative to the innovations possible with lecture-based online classes. These lead him into a very rewarding connection with Dawn Heuft, now permanently in the Instructional Technology position! This most-directly tied into student outcomes with the subsequent crash in the State's 3CMedia web-server two years ago! Tim and Dawn were the first to experience and to act upon server problems that culminated in that crash, and it was only the strong and consistent efforts by Dawn Heuft and suggestions from Dawn that allowed Tim's online classes to continue forward despite the server crash! (Likewise, certainly our persistence at least alerted 3CMedia staff that there was a problem, from whence a new server was quickly installed.) It's hard to imagine running challenging, student-directed and thus highly connected and homegrown-style online classes (as desired by the most recent Accreditation report) without the staff development opportunities of which Tim has participated.</p> <p>Likewise, Tim was asked by Dean Willard to join several other MNSEW faculty in giving a presentation at a large, flex week MNSEW Division Meeting. Previously, Dean Reece had briefly previewed the innovative nature of Tim's video-lectures to the MNSEW Division, and subsequently he has been asked to present and tutor on Camtasia software during Professional Development week.</p>

8.1	<p>What can your department do to attract more students to Geology?</p>	<p>A major part of the answer is to offer online sections of Geology that meet both student demand and Division standards. Thus, both Tim Cliffe and Chris Hill are actively in the process of developing high-quality online GEOL 110 classes. Chris will run hers starting with Summer 2020. Tim has been given classroom-size whiteboards from the soon-to-be-demolished 300's Building that fit into his truck. Thus, he's already recorded lectures onsite at Lake Tahoe, and in Los Angeles amongst oil derricks near Baldwin Hills, and statewide along the San Andreas Fault, as well as staged in the Earth Science Lab during FALL 2019, and with recorded classroom demonstrations from FALL 2019. He is currently deeply involved in the editing process in SPRING 2020, which he will continue full-time through SUMMER 2020.</p> <p>Meanwhile, we can do more post more advertising on campus and online for Geology. We will have more field trips for the class and lab. We can also have students do artwork/posters over geologic topics and post these in the hallways of building 32.</p>
8.2	<p>Please define "draconian section slashing" with facts. What were the course minimums were the courses expected to meet?</p> <p>Does the department continue the efforts you outlined to increase enrollment?</p>	<p>Contextually, the "draconian cuts" comment was not directed at our one little department, but to that one year of cuts across the entire campus that were directed <u>primarily</u> at "efficiency" relative to classroom size, rather than primarily to generating FTES (and thus, when large numbers of classes with 25 or 30 students from across the entire campus, for the first time ever at Grossmont College, were cancelled during the first week of classes; "draconian" in this context meant the obvious, that students don't come back to your college when you cut their classes in this manner, and that your college spirals downward in terms of FTES, which jeopardizes all departments; and our department is suffering like the entire college from the subsequent differential drop in FTES at Grossmont College vs. other local colleges, where "efficiency" was a <u>secondary</u> rather than primary concern).</p> <p>Absolutely.</p>
8.4	<p>What is the status of the "augmented reality sandbox currently?</p>	<p>The sandbox is running was planned to be used in the geology lab spring 2020; however, all on-campus classes were moved to online before the sandbox could be used. It will be used in lab Fall 2020 if we're able to meet on campus.</p>

<p>8.5</p>	<p>Please give a few examples of how the responsibilities for full-time faculty vs part-time faculty.</p> <p>Is the full-time faculty teaching load over .1 LED?</p>	<p>We don't understand either of these questions. They seem to be missing something. Nevertheless, we'll take a crack at it: Virtually all full-time overload currently taught is made possible because the amount of release time that we have—much of which is temporary. If we suffer any more cuts, we will be below 6.0 FTEF.</p>
<p>8.8</p>	<p>What steps have you taken to have your Earth Sciences Lab Tech position re-classified?</p>	<p>We have discussed the issue with Patty Sparks, who is supportive of reclassifying the tech position, but because reclassification would likely require a step up in pay scale, the department is undecided as to whether the reclassification would be worth the increased expense. We are working within the confines of the existing job description as best we can and only asking our tech to perform tasks beyond those boundaries if she is willing.</p>

**PROGRAM REVIEW COMMITTEE
SUMMARY EVALUATION**

The committee recommends maintaining this program. Following are the committee's specific commendations and recommendations.

The Program Review Committee commends the department for:

1. Zero text book costs for all courses
2. Creating the Global Studies AA-T degree
3. Integrating videos and experience during faculty real world travels to engage students in course content
4. Creating online classes with excellent engagement strategies for Distance Education
5. Developing an effective peer tutoring process to improve student success

Committee recommends the following:

1. Work with your Dean to create a job description for lab technician based on your department's needs
2. Embed methods into entry level courses that help prepare students for college level courses
3. Continue efforts to increase enrollment in Geology in the absence of Geo-Con
4. Revisit course offerings related to WSCH/FTEF to establish more efficient offerings/schedules (understand that each department contributes to overall college success and budget)

College President

Program or Department Chair

Academic Program Review Chair

EARTH SCIENCES

Academic Year	Fall		Spring	
	% Fill	WSCH/FTEF	% Fill	WSCH/FTEF
2013-14	87.0	602.1	76.3	537.8
2014-15	71.6	498.6	59.5	402.2
2015-16	64.0	425.7	63.7	410.4
2016-17	63.8	380.4	58.9	386.3
2017-18	61.0	410.0	70.3	437.4