Physical Sciences

Comprehensive Program Planning Report

Astronomy
Chemistry
Physics

Institutional Program Planning and Review

Earth and Ocean Science

Resource Allocation Plan

Physical Sciences Division

INSTRUCTIONAL COMPREHENSIVE PROGRAM PLANNING AND REVIEW (CPPR) FOR 2019

Only to be completed by those programs scheduled for the year according to the institutional comprehensive planning cycle for instructional programs (i.e., every four years for CTE programs and five years for all other instructional programs), which is produced by the Office of Academic Affairs. Faculty should meet with their dean prior to beginning this process. Training is available to support faculty completing this work.

Cluster: Math and Sciences
Program:

Current Academic Year: 2018-2019

Last Academic Year CPPR Completed: 2014-2015

Current Date: March 2019

NARRATIVE: INSTRUCTIONAL CPPR

Please use the following narrative outline:

I. GENERAL PROGRAM INFORMATION

A. Program mission (optional)

B. Brief history of the program

Facilities: installation of new telescope in Bowen Observatory (2006), and construction of new telescope shelter at North County campus (2015).

Curriculum: adoption of the Backwards-Faded Scaffolding curriculum developed by the Center for Astronomy & Physics Education Research (CAPER) Team at the University of Wyoming for Astr 210L laboratory (2012).

Staffing/enrollment: three lecture sections (ASTR 210) and two lab sections (ASTR 210L) per semester continue to be taught by two full-time faculty at the San Luis Obispo campus, and from 2007 onwards, also at the North County campus. A part-time faculty member teaches a distance-education research seminar (ASTR 299, since 2014). Overal enrollment in these two courses continue to remain steady with a fluctuation of within ±5% over the past five years.

C. Include significant changes/improvements since the last Program Review

In spring semester 2018 the evening section of ASTR 210 lecture on the San Luis Obispo campus was moved from the Science Forum 2402 to the new Instructional Building 2609.

D. List current faculty, including part-time faculty

James Eickemeyer (full-time)

Patrick M. Len (full-time)

Russ Genet (part-time)

E. Describe how the Program Review was conducted and who was involved

Patrick M. Len is primary investigator for Program Review, administering standardized student assessment tools, and collaborating with astronomy educators both on- and off-campus.

II. PROGRAM SUPPORT OF DISTRICT'S MISSION STATEMENT, INSTITUTIONAL GOALS, INSTITUTIONAL OBJECTIVES, AND/OR INSTITUTIONAL LEARNING OUTCOMES

A. Identify how your program addresses or helps to achieve the District's Mission Statement.

The mission of the astronomy program, which is part of the Physical Sciences Division, is to support the Mission of Cuesta College by enabling our students to achieve their academic, transfer, workforce preparation, career advancement, and personal goals. We provide preparation for transfer students who are required to take a general science course with or without a laboratory. The program also presents an excellent opportunity for students wishing to enhance their general education and scientific knowledge. The astronomy department is committed to integrating appropriate technology, modern instrumentation, traditional and contemporary pedagogical approaches, and assessment of student learning into classes to create a supportive environment that engages all students in classroom activities.

B. Identify how your program addresses or helps to achieve the District's Institutional Goals and Objectives, and/or operational planning initiatives.

Institutional Goal 1: Completion
Increase the rates of completion for degrees, certificates, and transfer-readiness overall for all students.

The astronomy program strives for academic excellence by promoting current best practices in astronomy instruction and assessing student learning outcomes. Methodologies and equipment are continually updated to ensure an enriching student experience. The program is committed to the goal of providing multiple opportunities for students taking ASTR 210 and ASTR 210L (as the lecture and laboratory can be taken either simultaneously or in separate semesters), and to adjust scheduling to accommodate room and facility usage of other courses.

Institutional Goal 2: Access
Increase student access to higher education.

The astronomy program offers opportunities for students to take courses at the San Luis Obispo and North County campuses, during daytime and evening hours.

Institutional Goal 4: Facilities and Technology
Integrate and improve facilities and technology to support student learning and the innovations needed to serve its diverse communities.

The astronomy program maintains facilities for students and the general public to use telescopes for observations.

C. Identify how your program helps students achieve Institutional Learning Outcomes.

ILO 2. Critical Thinking and Communication
Students achieving this outcome will be able to:
Analyze and evaluate their own thinking processes and those of others
Communicate and interpret complex information in a clear, ethical, and logical manner

To help students achieve this outcome in Astr 210, students learn how to apply appropriate models to analyze astronomical concepts:
http://waiferx.blogspot.com/search/label/astronomy%20essay%20question

ILO 3. Scientific and Environmental Understanding
Students achieving this outcome will be able to:
Draw conclusions based on the scientific method, computations or experimental and observational evidence
ILO 6. Technical and Informational Fluency
Students achieving this outcome will be able to:
Recognize when information is needed, and be able to locate and utilize diverse sources effectively and ethically
Produce and share electronic documents, images, and projects using modern software and technology

To help students achieve this outcome in Astr 210L, students learn how develop and/or execute procedures to gather evidence in order to answer astronomical research questions.

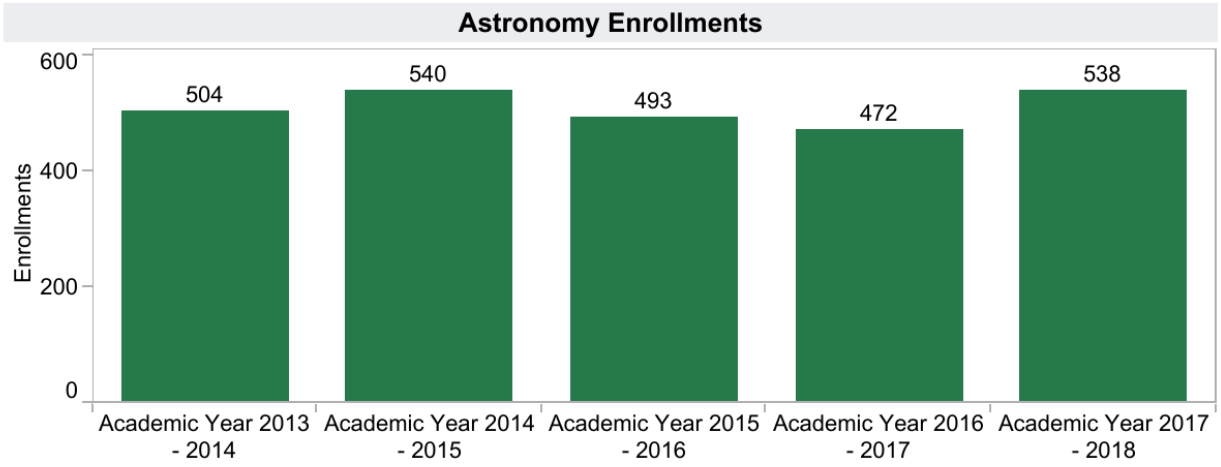
III. PROGRAM DATA ANALYSIS AND PROGRAM-SPECIFIC MEASUREMENTS

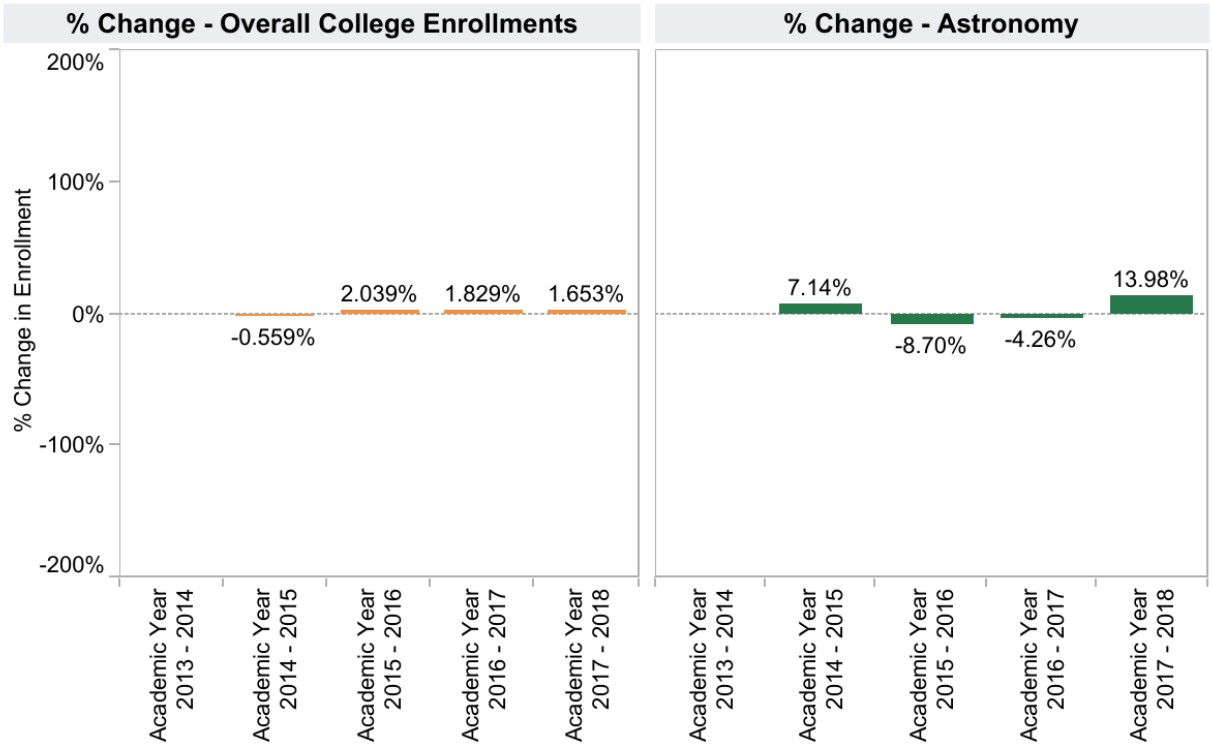
General Enrollment

Slight decrease in 2015-2016 and 2016-2017 enrollment is attributable to offering one fewer ASTR 210L section during those academic years; this has an effect on enrollment in ASTR 210, which is the associated co-requesite course. Enrollment in ASTR 299 varies greatly, strongly dependent on recruitment of SLO County high school students and/or distance learning students.

SLOCCCD Program Review Data - Enrollment

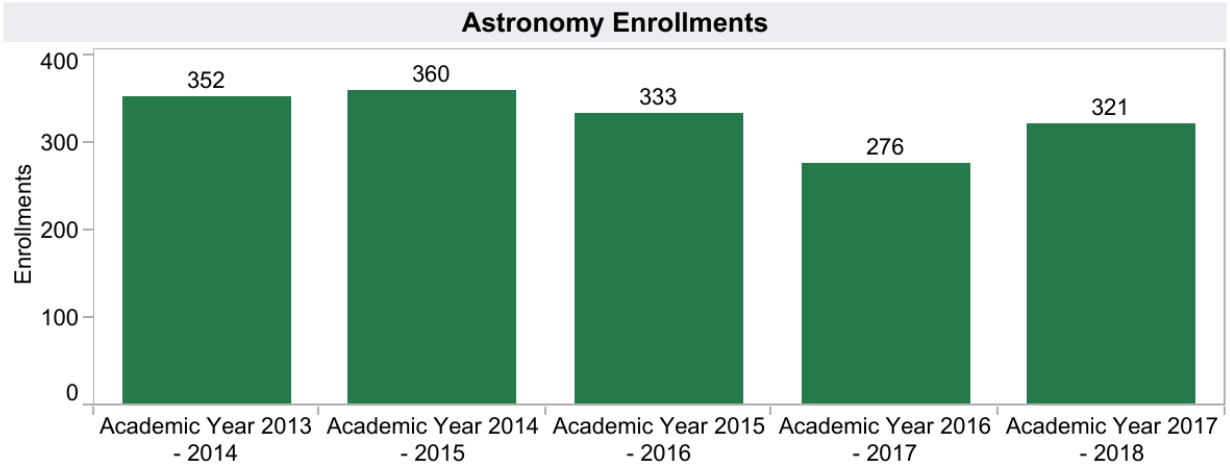
Department:	Course:	Dual Enrollment:	Prison:
Astronomy	All	All	All





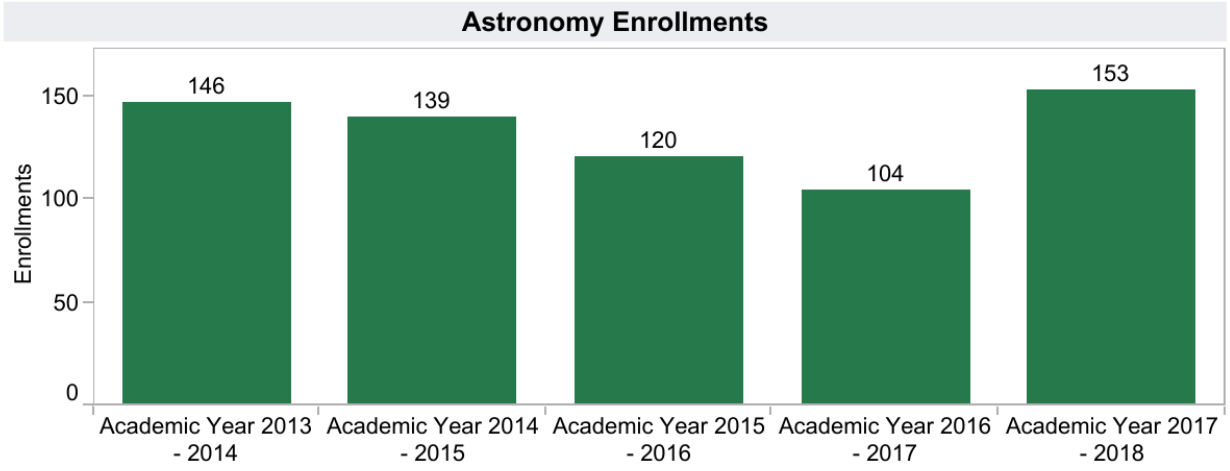
SLOCCCD Program Review Data - Enrollment

Department:	Course:	Dual Enrollment:	Prison:
Astronomy	ASTR 210	All	All



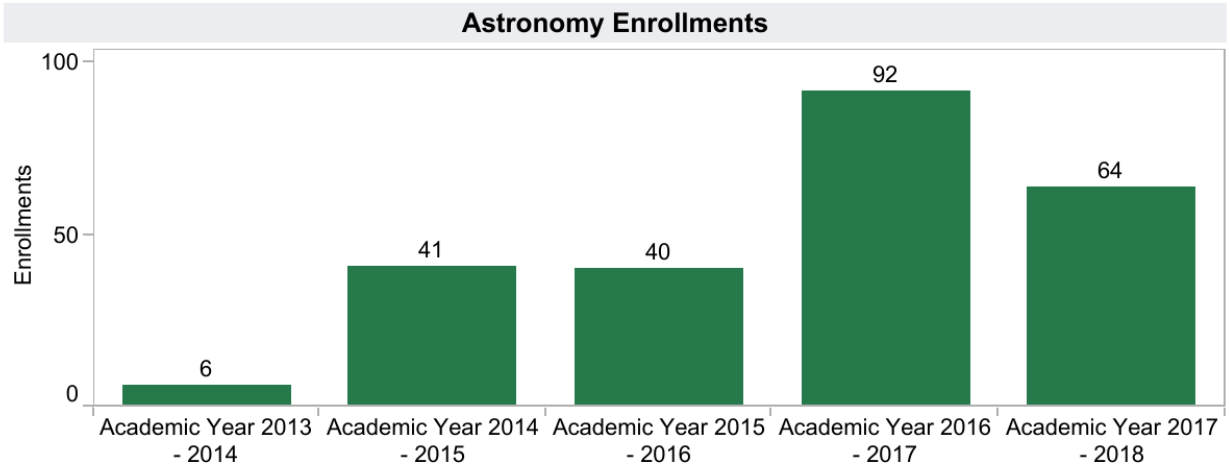
SLOCCCD Program Review Data - Enrollment

Department:	Course:	Dual Enrollment:	Prison:
Astronomy	ASTR 210L	All	All



SLOCCCD Program Review Data - Enrollment

Department:	Course:	Dual Enrollment:	Prison:
Astronomy	ASTR 299	All	All

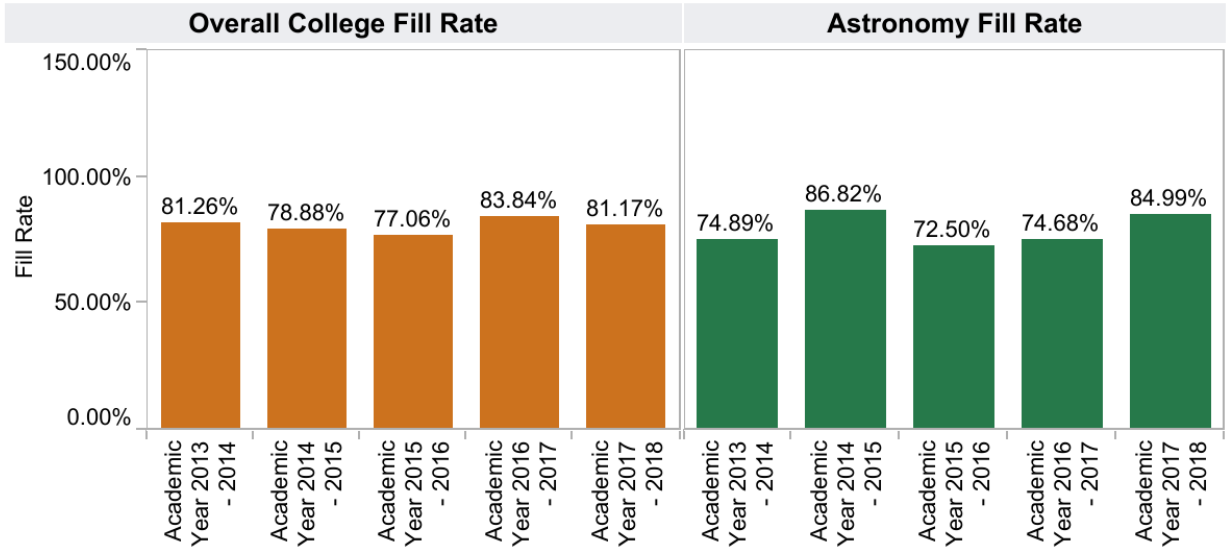


General Student Demand (Fill Rate) (Insert Aggregated Data Chart)

Overall, astronomy fill rates mirror the college's overall fill rate.

SLOCCCD Program Review Data - Student Demand (Fill Rate)

Department:	Course:	Dual Enrollment:	Prison
Astronomy	All	All	All

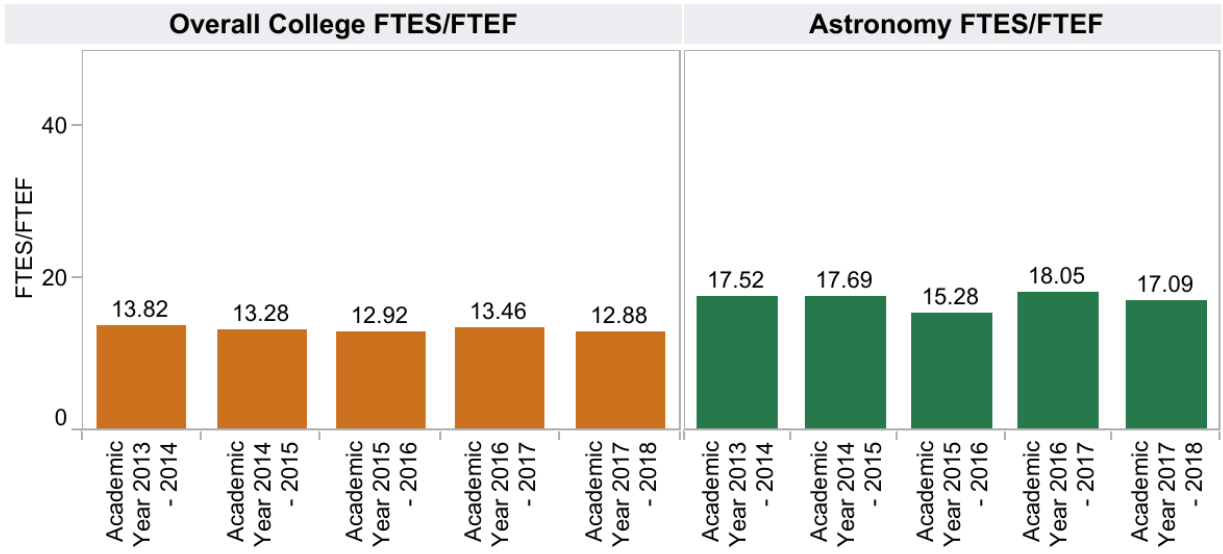


General Efficiency (FTES/FTEF)

The overall efficiency of astronomy courses is very high compared to the District efficiency over the past five-year history, due to large lectures of 45-60 students in each ASTR 210 lecture section, and many ASTR 210L lab sections be run at/or near capacity (24-28 students).

SLOCCCD Program Review Data - Efficiency (FTES/FTEF)

Department:	Course:	Dual Enrollment:	Prison:
Astronomy	All	All	All



Student Success—Course Modality

ASTR 210 and ASTR 210L are only offered in the face-to-face modality (with slight increase in success rates), while ASTR 299 is only offered as a distance-learning course (starting in 2014-2015), so there is no modality comparison within courses.

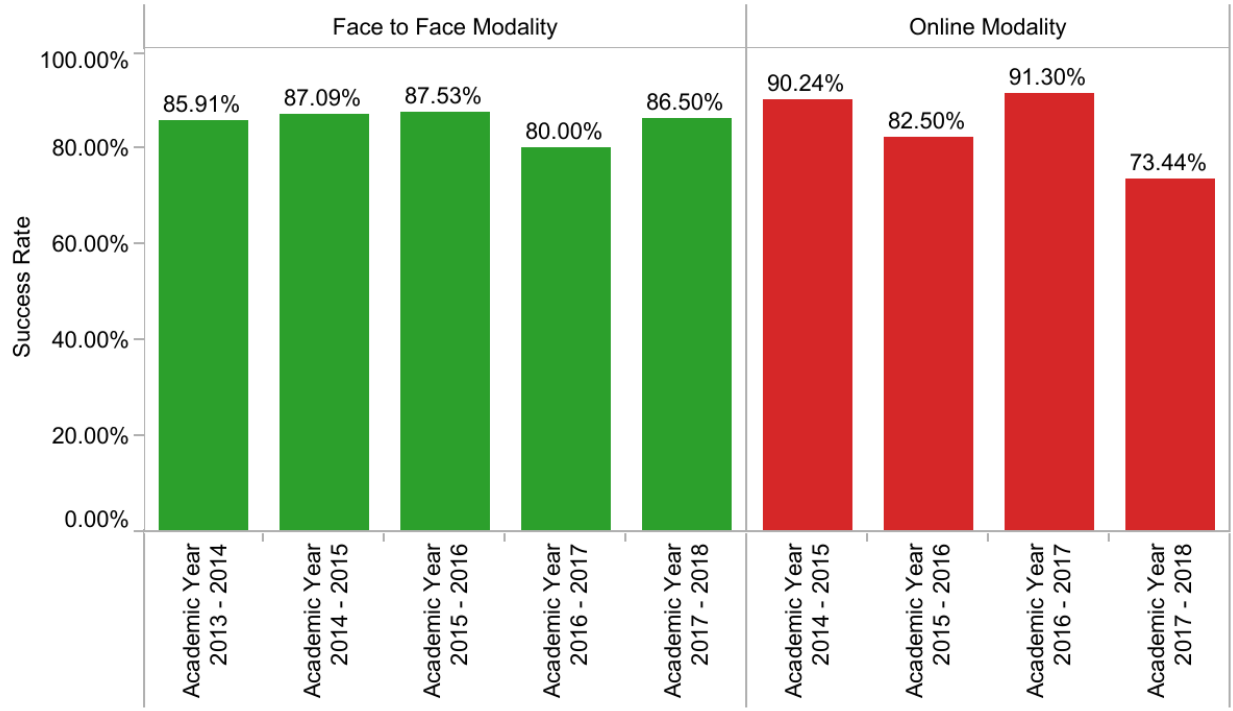
SLOCCCD Program Review Data: Successful Course Completion

Select Department:
Astronomy

Course:
All

Legend:
Face to Face Modality
Online Modality

Successful Course Competion by Modality -Astronomy



Successful Course Competion by Modality Table - Astronomy

		Academic Year 2013 - 2014	Academic Year 2014 - 2015	Academic Year 2015 - 2016	Academic Year 2016 - 2017	Academic Year 2017 - 2018
Face to Face Modality	Department Success Rate	85.91%	87.09%	87.53%	80.00%	86.50%
	Total Department Enrollments	504.0	490.0	449.0	380.0	474.0
Online Modality	Department Success Rate		90.24%	82.50%	91.30%	73.44%
	Total Department Enrollments		41.0	40.0	92.0	64.0

[Degrees and Certificates Awarded]

(Not applicable; Cuesta College has no degree/certificate programs for astronomy.)

[General Student Success – Course Completion]

The student success rate in astronomy courses is higher than the District-wide rate.

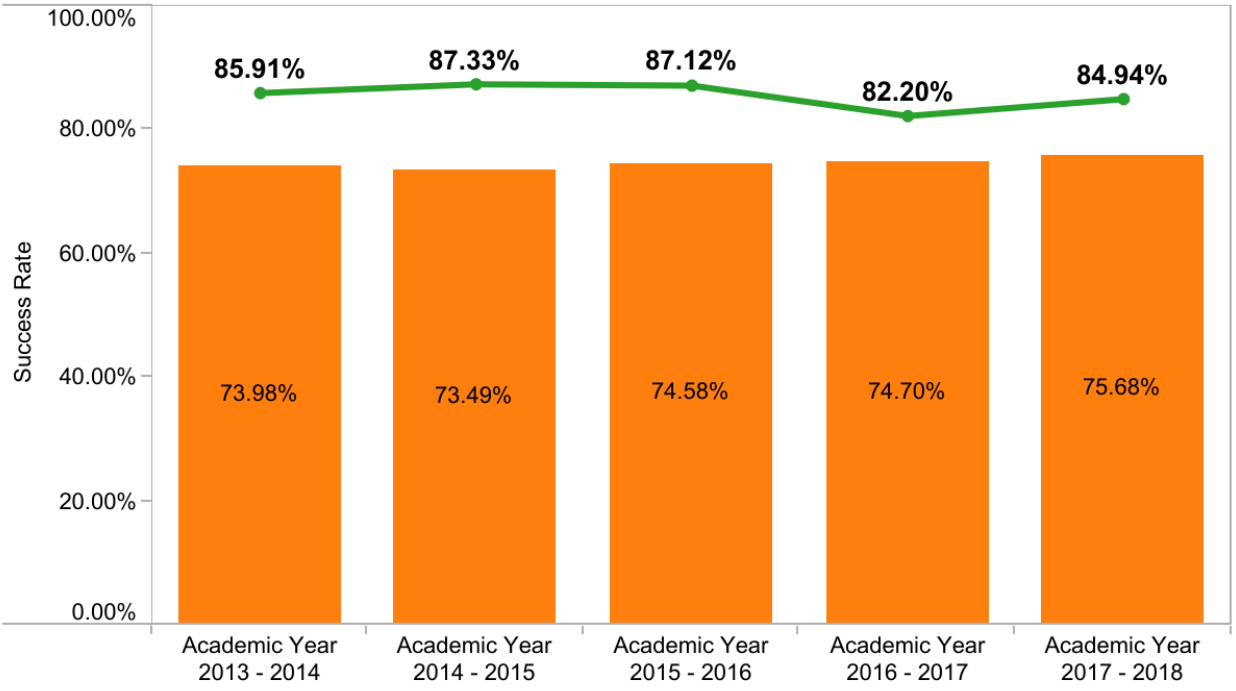
SLOCCCD Program Review Data: Successful Course Completion

Select Department: Astronomy

COURSE All

Measure Names
- Department Success Rate
- Overall College Success Rate

Successful Course Completion - Astronomy



Astronomy Success Rate Table

	Academic Year 2013 - 2014	Academic Year 2014 - 2015	Academic Year 2015 - 2016	Academic Year 2016 - 2017	Academic Year 2017 - 2018
Department Success..	85.91%	87.33%	87.12%	82.20%	84.94%
Total Enrollments	504	531	489	472	538

Success: The Percentage of student enrollments resulting in a final grade of "C" or better

Disaggregated Student Success

For both astronomy and all other Physical Sciences Division class, there is a comparable slightly lower completion rate for DSPS students vs. non-DSPS students.

Astronomy: 2013-2014 through 2017-2018

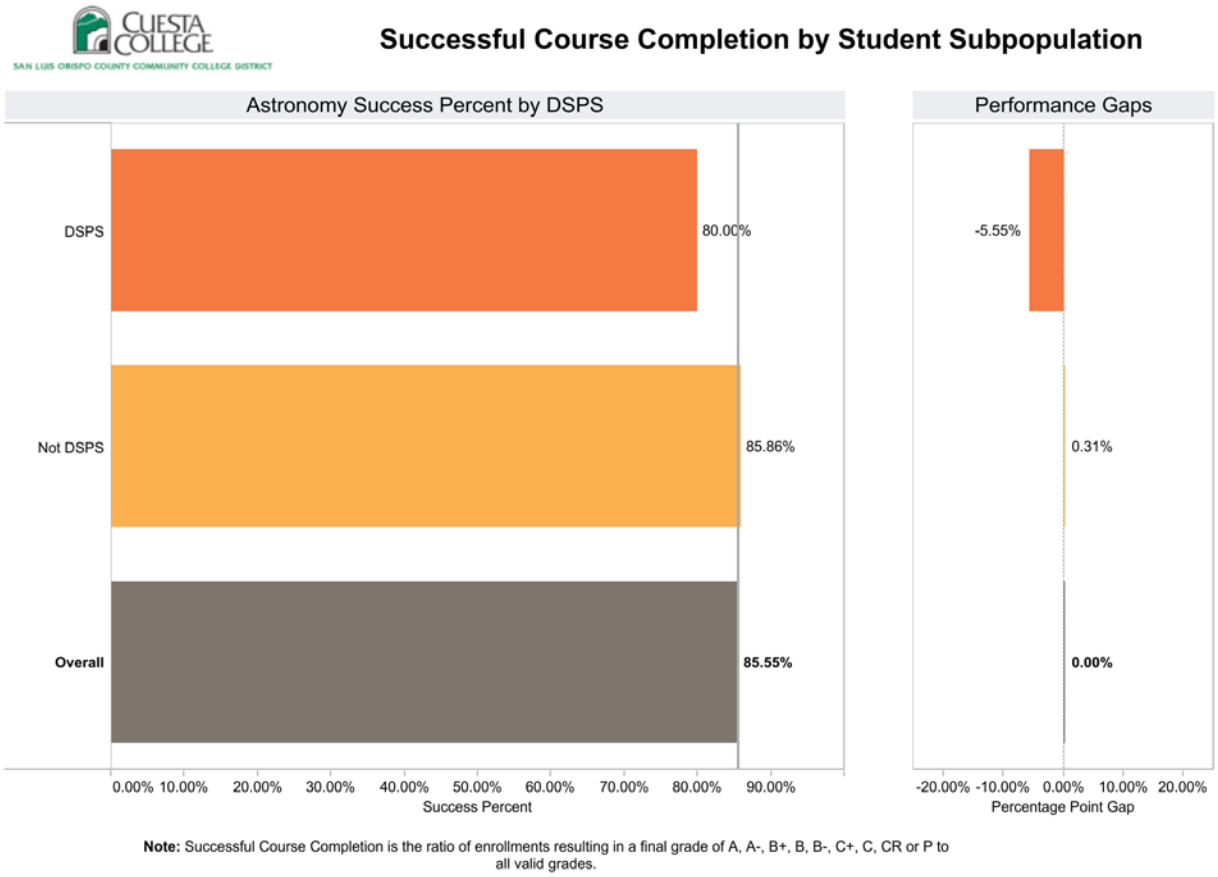
DSPS: 135 students
Not DSPS: 2,399 students
Overall: 2,534 students

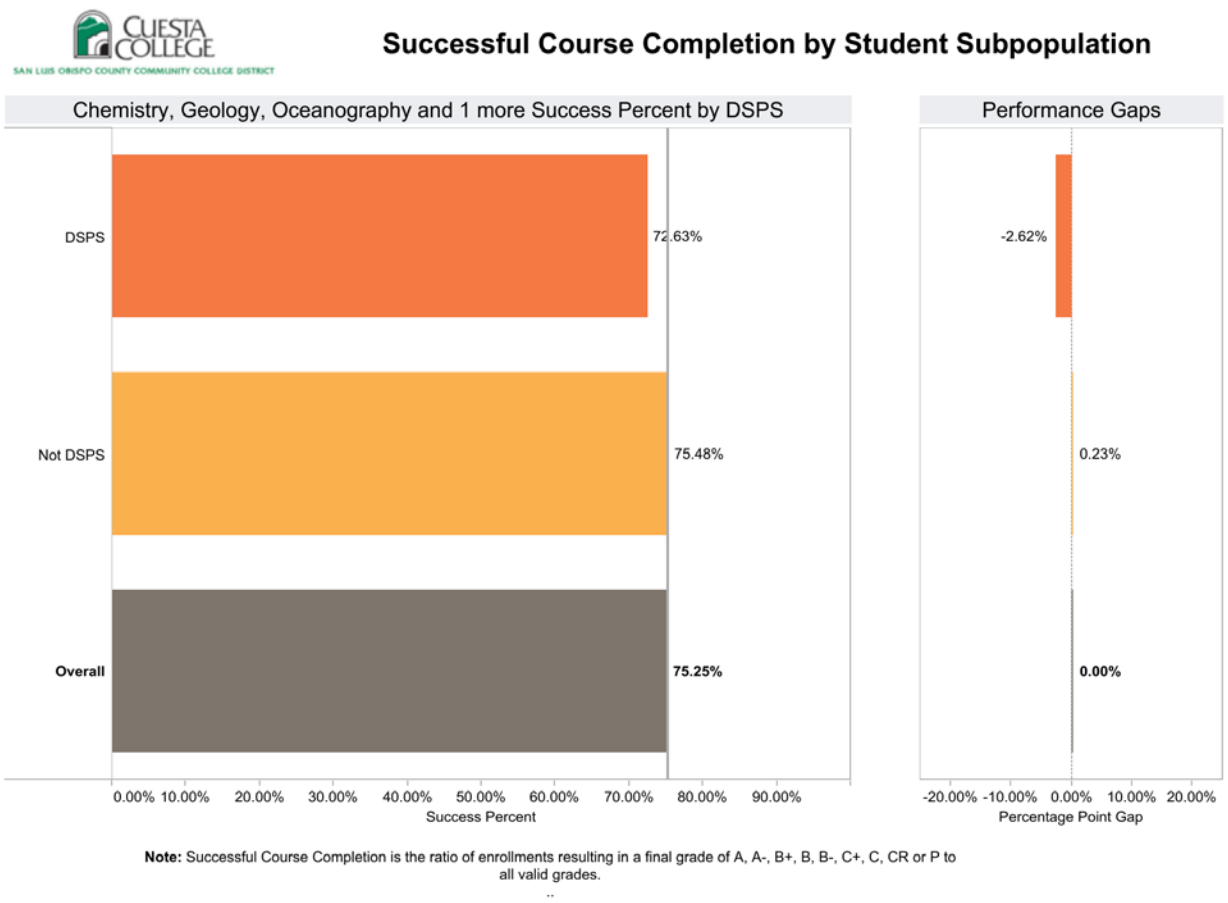
Chemistry, Geology, Oceanography, Physics: 2013-2014 through 2017-2018

DSPS: 991 students

Not DSPS: 11,159 students

Overall: 12,150 students





- Other Relevant Program Data (optional)

  Provide and comment on any other data that is relevant to your program such as state or national certification/licensure exam results, employment data, etc. If necessary, describe origin and/or data collection methods used.

  (N/A.)

IV. CURRICULUM REVIEW

A. List all courses and degrees/certificates that have been created, modified, or deactivated (and approved by the Curriculum Committee) since the last CPPR. Complete the Curriculum Review Template and submit the form within your CPPR.

(None.)

B. Completing the template will provide evidence that the curriculum (including course delivery modalities) has been carefully reviewed during the past five years for currency in teaching practices, compliance with current policies, standards, regulations, and with advisory committee input. The form requires you to include evidence that the following entries on the course outline of record (CurricUNET format) are appropriate and complete:

- Course description
- Student learning outcomes
- Caps
- New DE addendum is complete
- MQDD is complete
- Pre-requisites/co-requisites
- Topics and scope
- Course objectives
- Alignment of topics and scopes, methods of evaluation, and assignments with objectives
- Alignment of SLOs and objectives with approved requirement rubrics (General Education, Diversity, Health, Liberal Arts)
- Textbooks
- CSU/IGETC transfer and AA GE information
- Degree and Certificate information

The template also includes a calendar of a five-year cycle during which all aspects of the course outline of record and program curriculum, including the list above, will be reviewed for currency, quality, and appropriate CurricUNET format.

Patrick M. Len, in close collaboration with Curriculum Commitee member Alexandra Kahane, has reviewed and updated ASTR 210, ASTR 210L and ASTR 299 information on CurricuNET in spring 2015, and all other course outline of record information was also checked.

These courses will be reviewed (and updated as necessary) on a five-year cycle, with the next review/revision expected to be in spring 2020.

V. PROGRAM OUTCOMES, ASSESSMENT AND IMPROVEMENTS

A. Attach or insert the assessment calendar for your program for the next program review cycle.

B. ASTR Course Assessment Calendar

CYCLE STAGE	Fall 2016	Sp 2017	Fall 2017	Sp 2018	Fall 2018	Sp 2019	Fall 2019	Sp 2020	Fall 2020
SLO Assessment		ASTR 210 ASTR 210L				ASTR 210 ASTR 210L			
Analyze Results & Plan Improvements			ASTR 210 ASTR 210L				ASTR 210 ASTR 210L		
Plan Implementation				ASTR 210 ASTR 210L				ASTR 210 ASTR 210L	

C. Have you completed all course assessments in eLumen? If no, explain why you were unable to do so during this program review cycle and what plan(s) exist for completing this in the next program review cycle.

Yes, ASTR 299 was last assessed in 2015, and ASTR 210/210L were last assessed in 2017.

D. Include the most recent "PLO Summary Map by Course" from eLumen which shows the Course-level SLOs mapped to the Program-level SLOs.

N/A. ASTR is not a program; it is a set of two courses.

E. Highlight changes made at the course or program level that have resulted from SLO assessment.

Students receive emphasis on spatial skills (drawing diagrams, locating positions of celestial objects, etc.) in lecture and in laboratory to interpret and predict astronomical phenomena.

F. Identify and describe any budget or funding requests that are related to student learning outcome assessment results. If applicable, be sure to include requests in the Resource Plan Worksheet.

Replace Building 2400 astronomy dome crank mechanism, make motorized. Supports Institutional Objective 1.1, 1.2.

Provide a path connecting the NCC telescope shelter to the common paved area. Demonstrates need from IPPR. Inclement weather and poor drainage in area prevents student use of the shelter and diminishes learning experiences.

Reconnect electrical in the NCC telescope shelter. Supports Institutional Objective 1.1, 1.2. Lack of power to circuit box prevents use of motorized telescopes, and no lighting availability increases the chance of accidents occuring at night.

Install 2nd projector and screen in N2401. Supports Institutional Objective 2.x.

VI. PROGRAM DEVELOPMENT

Indicate how the program supports efforts to achieve any of the following:

A. Institutional Goals and Objectives
B. Institutional Learning Outcomes
C. Program outcomes

(Cf. Sections II.A, II.B, and II.C.)

Indicate any anticipated changes in the following areas:

A. Curriculum and scheduling
B. Support services to promote success, persistence and retention
C. Facilities needs
D. Staffing needs/projections

Lastly, address any changes in strategy in response to the predicted budget and FTES target for the next program review cycle.

(C. Facilities needs)
During construction of the Student Services Building on the North County Campus, electricity and safe pedestrian access to the telescope shelter at the north side of campus was lost; ongoing efforts are being made to restore power and safe access.

The 14" Meade reflector at the Bowen Observatory on top of the 2401/2402 science forum building is now 14 years old, and should be refurbished and realigned. There does not seem to be any local technician available to perform these tasks, so Cuesta faculty and/or volunteer members from the Central Coast Astronomical Society may need to be trained in order to do so. A technical assistant could be used to set up, run, and shut down the telescope during instructional time, such that students can view objects through the telescope during lecture, and to free up the instructor from preparing and running the telescope during lecture. A continuing problem is that the mechanism for opening and closing the slit doors for the dome continue to deteriorate, and this require constant repairs when parts fail.

Addition of a second digital projector in the N2401 classroom will enable viewing of multiple

screens of instruction, as is done in every other classroom where ASTR 210 and 210L has been or is currently offered (2609, 2401, 2402, 2101, 2105, 2108, N2409, N2439).

The opening of a doorway between the chemistry and physics/astronomy labs in the N2400 building will facilitate direct access to cross-disciplinary equipment during labs.

VII. END NOTES

If applicable, you may attach additional documents or information, such as awards, grants, letters, samples, lists of students working in the field, etc.

In August 2016, Patrick M. Len presented "Writing Weekly Current Events Quiz Questions" workshop for introductory astronomy educators at the 2016 Astronomy Teaching Summit Conference, sponsored by the Center for Astronomy & Physics Education Rearch.

Students in Cuesta College's ASTR 299 research seminar collaborate with students at other community colleges to use remote robotic telescopes, analyze data, write up and submit results for publication, as reported in Robotic Telescopes, Student Research and Education (RTSRE) Conference proceedings in 2017.

VIII. After completing and submitting this document, please complete the Overall Program Strength and Ongoing Viability Assessment with your Dean before May 15, 2018.

SIGNATURE PAGE

Faculty, Director(s), Manager(s), and/or Staff Associated with the Program

Instructional Programs: All full-time faculty in the program must sign this form. If needed, provide an extra signature line for each additional full-time faculty member in the program. If there is no full-time faculty associated with the program, then the part-time faculty in the program should sign. If applicable, please indicate lead faculty member for program after printing his/her name.

Student Services and Administrative Services Programs: All full-time director(s), managers, faculty and/or classified staff in the program must sign this form. (More signature lines may be added as needed.)

Division Chair/Director Name	Signature	Date
Name	Signature	Date
Name	Signature	Date
Name	Signature	Date
Name	Signature	Date
Name	Signature	Date
Name	Signature	Date

SUPPLEMENTAL DOCUMENTS

FACULTY HIRING PRIORITIZATION INFORMATION (IF APPLICABLE)

If your program requested a faculty position for consideration, please attach or embed the following worksheets that were presented to the College Council. The guidelines for faculty prioritization can be found here: https://cuestacollege.sharepoint.com/Committees/IPPR/Committee%20Documents?viewpath=%2FCommittees%2FIPPR%2FCommittee%20Documents&id=%2FCommittees%2FIPPR%2FCommittee%20Documents%2FPrioritization%20Process%20Handbook%20Sept%5F25%5F2018%2Epdf&parent=%2FCommittees%2FIPPR%2FCommittee%20Documents

APPLICABLE SIGNATURES:

Vice President/Dean	**Date**
Division Chair/Director/Designee	**Date**
Other (when applicable)	**Date**

The above-signed individuals have read and discussed this review. The Director/Coordinator, Faculty, and staff in the program involved in the preparation of the CPPR acknowledge the receipt of a copy of the Vice President/ Dean's narrative analysis. The signatures do not necessarily signify agreement.

INSTRUCTIONAL COMPREHENSIVE PROGRAM PLANNING AND REVIEW (CPPR) FOR 2019

Only to be completed by those programs scheduled for the year according to the institutional comprehensive planning cycle for instructional programs (i.e., every four years for CTE programs and five years for all other instructional programs), which is produced by the Office of Academic Affairs. Faculty should meet with their dean prior to beginning this process. Training is available to support faculty completing this work.

Cluster: Math and Sciences
Program: Chemistry **Current Academic Year:** 2018-2019

Last Academic Year CPPR Completed: 2014-2015 **Current Date:** March 2019

NARRATIVE: INSTRUCTIONAL CPPR

Please use the following narrative outline:

IX. GENERAL PROGRAM INFORMATION

F. Program mission (optional)
The mission of the Chemistry Program, which is part of the Physical Sciences division, is to support the Mission of Cuesta College by assisting our students to achieve their academic, transfer, workforce preparation, career advancement, and personal goals. We provide preparation for transfer students majoring in chemistry and related science and engineering fields and for occupational students who need chemistry-related knowledge and skills. The department also presents an excellent opportunity for students wishing to enhance their general education and scientific knowledge. The chemistry department is committed to integrating appropriate technology, modern instrumentation, traditional and contemporary pedagogical approaches, and assessment of student learning into classes to create a supportive environment that engages all students in classroom activities.

G. Brief history of the program
The Chemistry Program has evolved to align closely with the degree requirements of undergraduate universities and provides freshman and sophomore-level Chemistry courses that are transferable for Chemistry and other science and engineering majors. Current course offerings satisfy most transfer requirements and articulation agreements are in place for many of the CSU and UC campuses. The program's current core course offerings consist of the following:

Chem 201A	General College Chemistry
Chem 201B	General College Chemistry
Chem 210	Introductory Chemistry
Chem 210FL	Introductory Chemistry with Facilitator Assisted Learning

Chem 211	Introductory Organic/Biochemistry
Chem 212A	Organic Chemistry
Chem 212B	Organic Chemistry

These courses fulfill the General Education requirement in the Physical Sciences, act as prerequisites for the Nursing Program and Biology classes, and fulfill the transfer curriculum for most science majors. In addition, Chem 201AX, Chem 201BX, Chem 201P, and Chem 245A-245C (which support the Facilitator Assisted Learning program), Chem 193 Special Topics, and Chem 247 Independent Studies are also offered.

H. Include significant changes/improvements since the last Program Review

The chemistry department introduced two new courses to help students to succeed in the general chemistry series. Chem 201P Preparation for General College Chemistry has been offered since fall 2015. Initially taught as a blended courses, it was converted to a fully online course in the fall of 2017. Chem 201P is a 2 unit, lecture only course taught in the second 9 weeks of the semester. It is designed for students who meet the prerequisites for Chem 201A, but who need more background in chemistry to be successful in that course. Initially, Chem 201P was only offered in fall and spring semesters, but due to student request, it was added to the summer schedule starting in summer 2018. Students report satisfaction with the course and state that they feel more prepared for general chemistry upon completion of Chem 201P.

Chem 201BX Problem Solving in General College Chemistry II is being offered for the first time this spring 2019 semester. In this 1-unit course, students work in groups to solve chemistry problems related to what they are learning in Chem 201B. Chem 201BX was modeled after Chem 201AX, which has been taught as a companion to Chem 201A for several years. Students requested the addition of Chem 201BX after taking Chem 201AX their previous semester.

The purchase of new instruments, NMR and HPLC, have improved instruction in Chem 212B organich chemistry II so that students now have more applicable hands-on data-acquisition experience in this important capstone course. Due to the new instrumentation, topics were switched between Chem 212A and Chem 212B so that students learn more instrumentation (infrared spectroscopy, IR) in Chem 212A. This helps students to master the acquisition and interpretation of instrumentation data by starting them earlier in learning instrumentation and spreading out the material so that they can master one instrument before learning another.

I. List current faculty, including part-time faculty

1. Praveen Babu (FT)
2. Greg Baxley (FT, 40% reassigned time)
3. Lara Baxley (FT, 60% reassigned time)
4. Christine Braun (PT)
5. Bret Clark (FT, partial load in chemistry)
6. Phil DaSilva (PT)
7. Kelli Gottlieb (FT)
8. Alex Kahane (FT, 40% reassigned time)
9. Eric Novitski (FT)
10. Feride Schroeder (PT, most of load is in geology)

11. Ken Ward (PT)

We have had a significant decrease in the number of chemistry faculty since the last program review. At the time of the previous program review submission (spring 2014), the chemistry department employed 7 FT faculty (one was FT temp for one semester) and 9 PT faculty. We now have 7 FT tenured or tenure-track faculty, but four of them have a significant portion of their load elsewhere. The number of PT faculty has decreased from 9 to 4, with one of them teaching almost entirely in geology.

J. Describe how the Program Review was conducted and who was involved

All FT members of the chemistry department were invited to participate in the program review. The two tenure track faculty members were asked to read the document and provide feedback. Three of the FT faculty members and the division chair took on the primary responsibility to write different sections of the CPPR and all were asked to review the entire document before submitting.

X. PROGRAM SUPPORT OF DISTRICT'S MISSION STATEMENT, INSTITUTIONAL GOALS, INSTITUTIONAL OBJECTIVES, AND/OR INSTITUTIONAL LEARNING OUTCOMES

D. Identify how your program addresses or helps to achieve the District's Mission Statement.

Chemistry supports the district mission by supporting students in their efforts to complete the chemistry and related STEM degrees, advancing in the workforce, and transfer to 4-year institutions. Chemistry is required for transfer in most STEM disciplines and as a prerequisite for classes required for nursing programs. Chemistry courses improve the scientific literacy and curiosity needed to make informed decisions about complex issues.

E. Identify how your program addresses or helps to achieve the District's Institutional Goals and Objectives, and/or operational planning initiatives.

Institutional Goal 1 and Objectives 1.1 and 1.2 focus on increasing student success and creating a positive college environment. The Chemistry program strongly supports these Institutional objectives. Chemistry has actively pursued increasing student success with a variety of support mechanisms such as the 201AX/BX, 201P companion courses, the 210FL peer assisted learing program, and the use of embedded tutors.

Institutional Goal 2 focuses on student access to higher education. Chemistry has made an effort to improve access by offering a blended (partially online) Chem 201A course. The department is considering expanding this modality to Chem 201B in the future.

F. Identify how your program helps students achieve Institutional Learning Outcomes.

Students who complete Chem 210FL, Chem 201A, Chem 201B, Chem 211, Chem 212A, or Chem 212B will meet the following ILOs:
ILO 2 Critical Thinking and Communication
Students in all chemistry courses improve their critical thinking skills by analyzing complex chemistry problems in both lecture and laboratory settings. In the laboratory

in particular, students are required to develop experimental plans and molecular-level models to relay chemical information. Students improve their communication skills by answering questions in both sentence and chemical symbol formats. In Chem 212, students practice scientific communication by keeping a laboratory notebook and writing lab reports following the industry-standard American Chemistry Society style.

ILO 3 Scientific and Environmental Understanding

All courses in the chemistry program help students improve scientific understanding. The lab component of chemistry courses is essential for the outcome of drawing conclusions based on the scientific method, computations or experimental and observational evidence. All courses have students construct and analyze statements in a formal symbolic system (chemical symbols).

ILO 6 Technical and Information Fluency

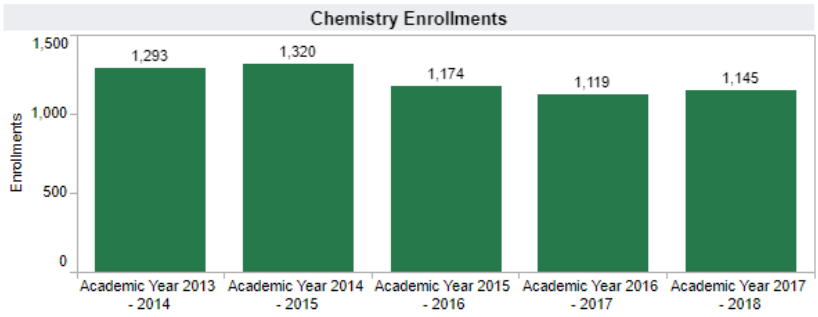
Many of the laboratory experiments in Chem 201A/201B General College Chemistry require students to measure data using computer controlled instrumentation. Students also manipulate and graph data using excel. Most homework is completed through an online homework system, Mastering Chemistry.

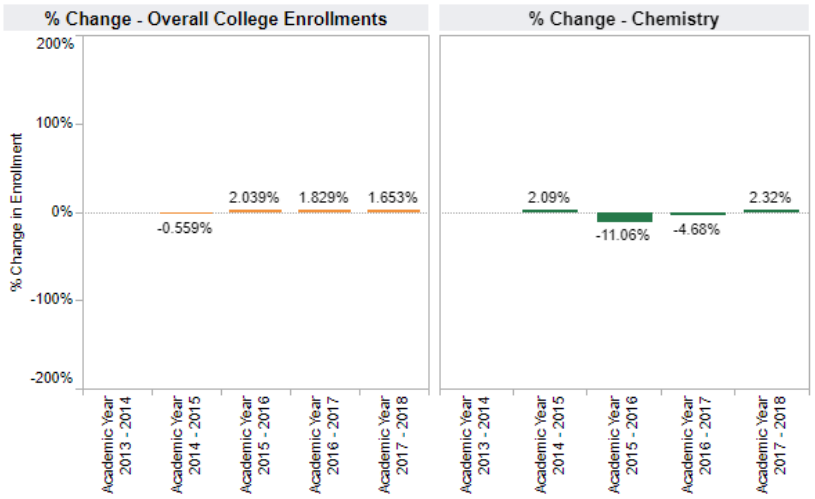
XI. PROGRAM DATA ANALYSIS AND PROGRAM-SPECIFIC MEASUREMENTS

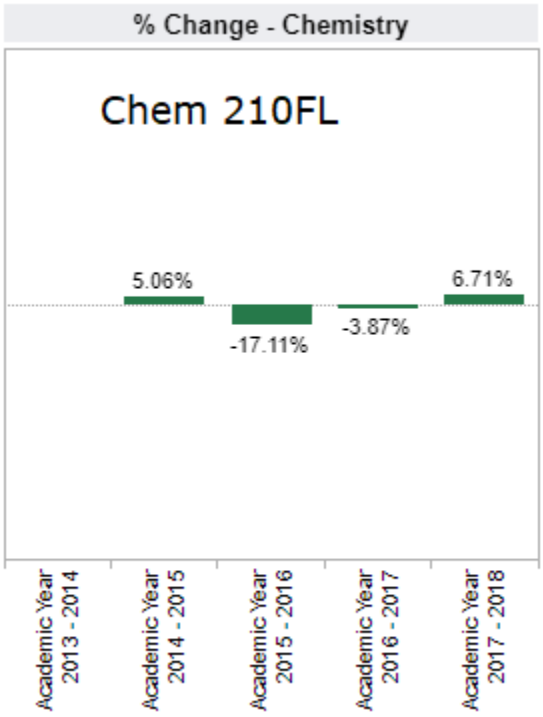
The data components are hyperlinked below.

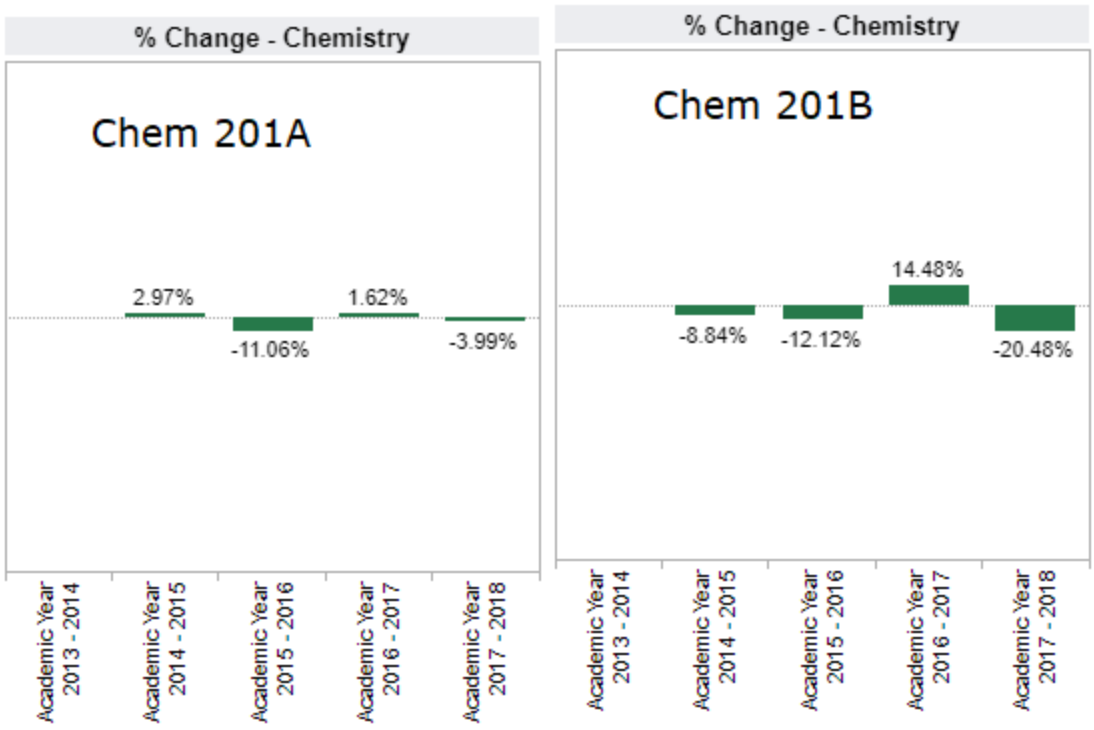
General Enrollment (Insert Aggregated Data Chart)

Insert the data chart and explain observed differences between the program and the college.
All Chemistry Enrollments


Chemistry Enrollments
Enrollments
1,500
1,000
500
0
1,293
1,320
1,174
1,119
1,145
Academic Year 2013 - 2014
Academic Year 2014 - 2015
Academic Year 2015 - 2016
Academic Year 2016 - 2017
Academic Year 2017 - 2018

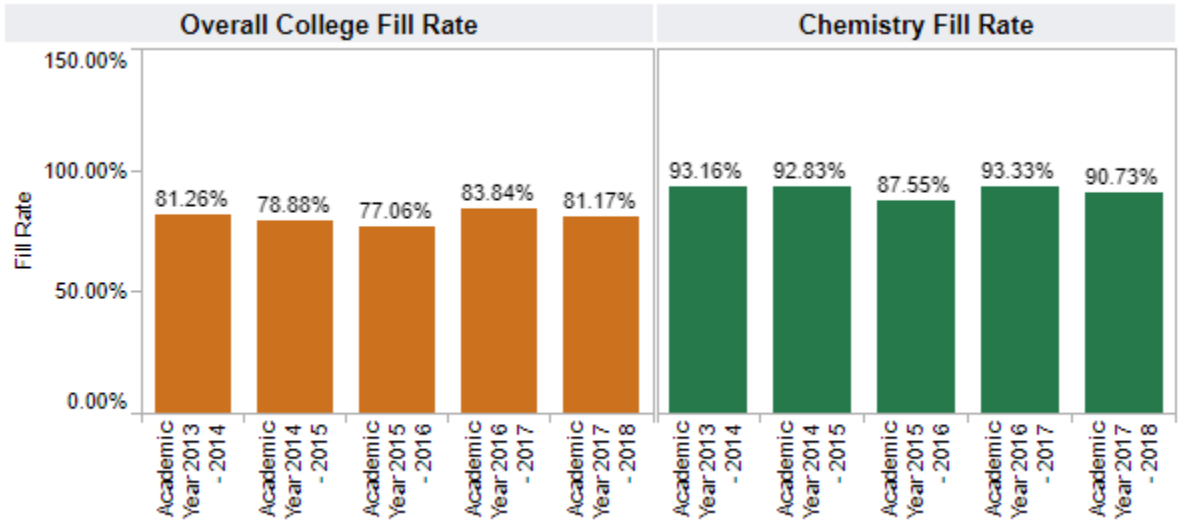

% Change - Overall College Enrollments
% Change in Enrollment
200%
100%
0%
-100%
-200%
-0.559%
2.039%
1.829%
1.653%
Academic Year 2013 - 2014
Academic Year 2014 - 2015
Academic Year 2015 - 2016
Academic Year 2016 - 2017
Academic Year 2017 - 2018
% Change - Chemistry
2.09%
-11.06%
-4.68%
2.32%
Academic Year 2013 - 2014
Academic Year 2014 - 2015
Academic Year 2015 - 2016
Academic Year 2016 - 2017
Academic Year 2017 - 2018


% Change - Chemistry
Chem 210FL
5.06%
-17.11%
-3.87%
6.71%
Academic Year 2013 - 2014
Academic Year 2014 - 2015
Academic Year 2015 - 2016
Academic Year 2016 - 2017
Academic Year 2017 - 2018



Chemistry enrollment has dropped overall while the college has had a slight increase. Part of this reason is that it has been exceptionally difficult to retain and hire new adjunct instructors. This led chemistry to hire new FT tenure track faculty in fall 2017 and fall 2018. There are 3 chemistry faculty with reassigined time for college business, which also impacts the number of sections offered and thus the enrollment.

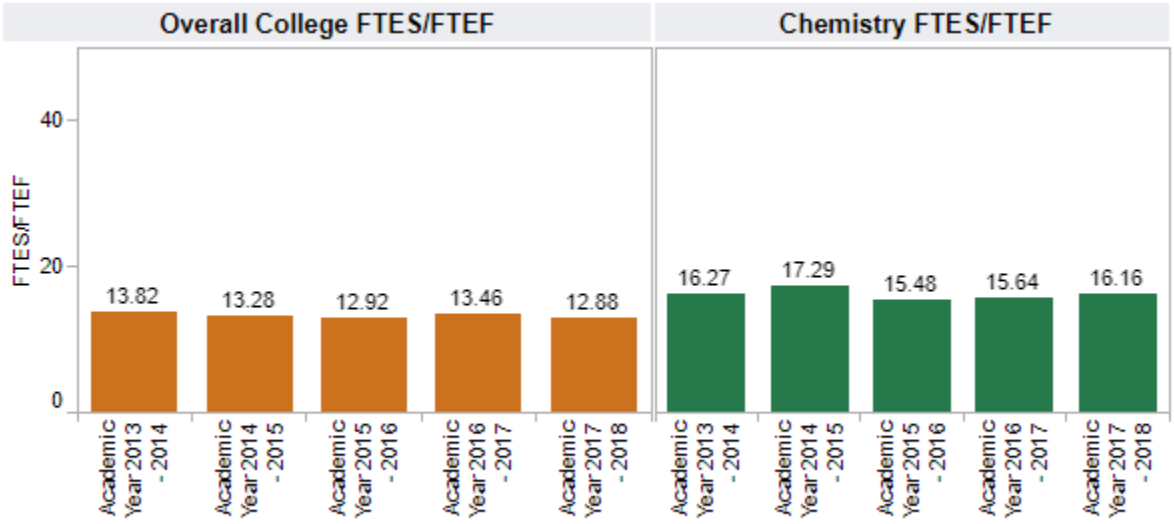
General Student Demand (Fill Rate) (Insert Aggregated Data Chart)



Chemistry fill rates remain higher than the college average. It is expected that more sections of some chemistry courses could be added if there were enough faculty members to teach them.

General Efficiency (FTES/FTEF) (Insert Aggregated Data Chart)

Insert the data chart and explain observed differences between the program and the college.

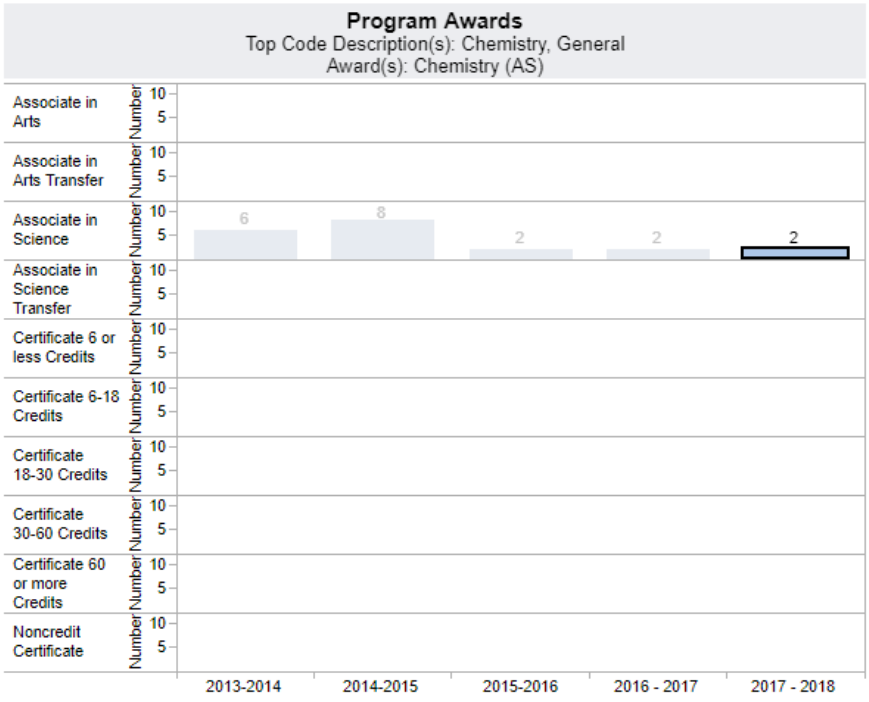


Chemistry is one of the most efficient departments at the college, mostly due to the reduced loading in labs and the combined lab/lecture format for many of our offerings.

Student Success—Course Modality (Insert Data Chart)
Insert the data chart and explain observed differences between the program and the college.

There are not enough sections of online courses for an adequate comparison.

Degrees and Certificates Awarded (Insert Data Chart)
Insert the data chart and explain observed differences between the program and the college.



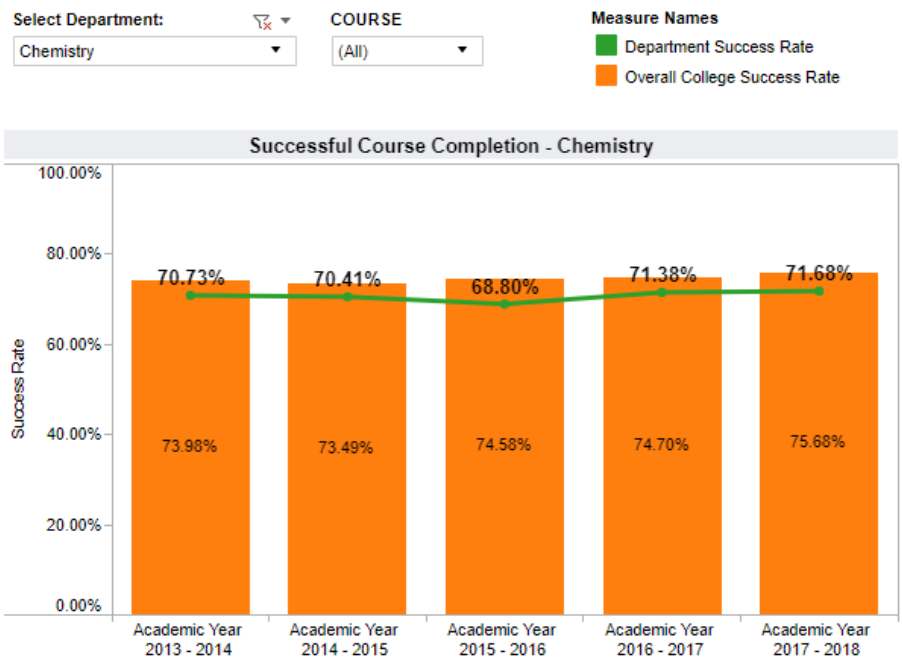
Program Awards Table

Award Type	Award	2013-2014	2014-2015	2015-2016	2016 - 2017	2017 - 2018
Associate in Science	Chemistry (AS)	6	8	2	2	2
	Total	6	8	2	2	2
Grand Total		6	8	2	2	2

Chemistry degrees are not highly valued by students due to the excessive unit load of ancillary required courses beyond typical STEM preparation (health and diversity). The concern over this requirement was also noted in the 2014 CPPR. Chemistry will be proposing to waive this requirement to investigate its impact upon the number of degrees awarded.

General Student Success – Course Completion (Insert Aggregated Data Chart)

Insert the data chart and explain observed differences between the program and the institutional set standards (as shown on the chart).



Chemistry Success Rate Table

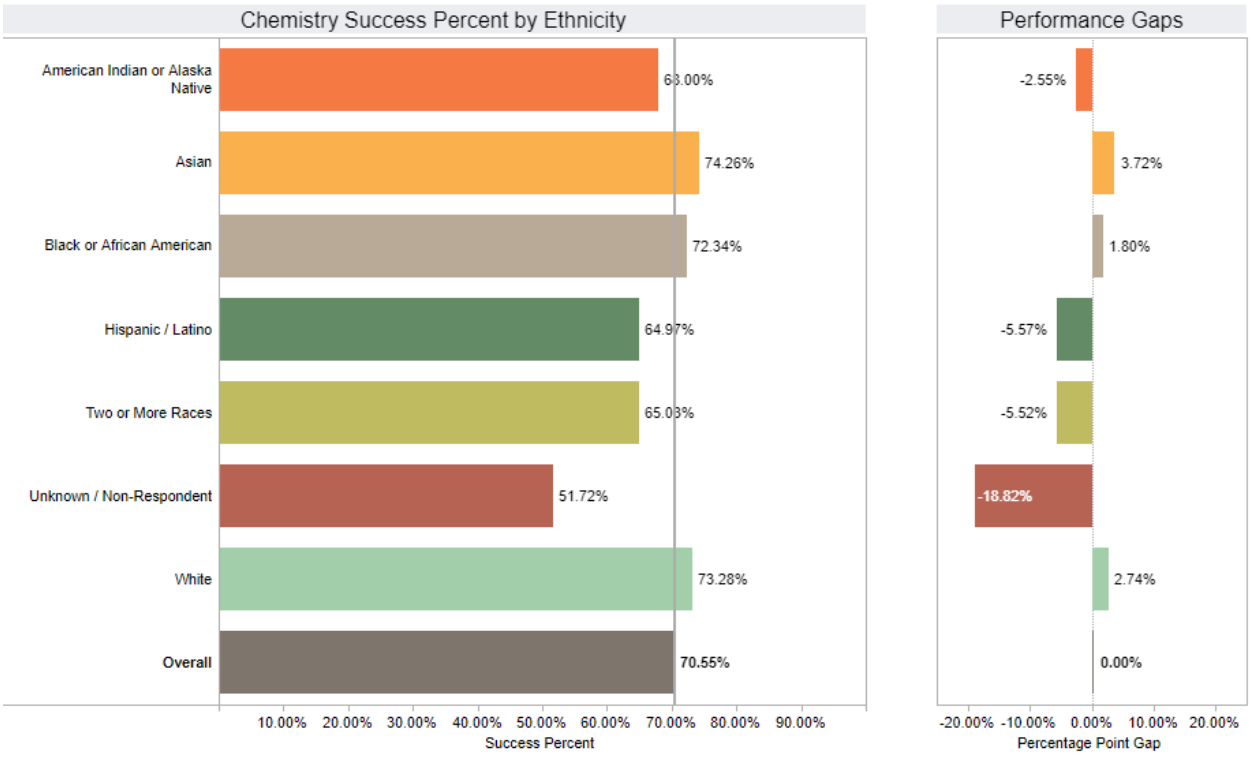
	Academic Year 2013 - 2014	Academic Year 2014 - 2015	Academic Year 2015 - 2016	Academic Year 2016 - 2017	Academic Year 2017 - 2018
Department Success..	70.73%	70.41%	68.80%	71.38%	71.68%
Total Enrollments	1,288	1,319	1,174	1,119	1,145

Chemistry is slightly below the college average for success.
The chemistry program has several initiatives to improve student success. The Facilitator Assisted Learning program for Chem 210FL provides peer-led study groups and problem solving support for students. General chemistry (Chem 201A and Chem 201B) students are supported through problem-solving courses Chem 201AX and Chem 201BX as well as a new preparatory bridge course Chem 201P. In addition, several faculty members in the department participate in the embedded tutor program and/or provide office hours in the Student Success Center.

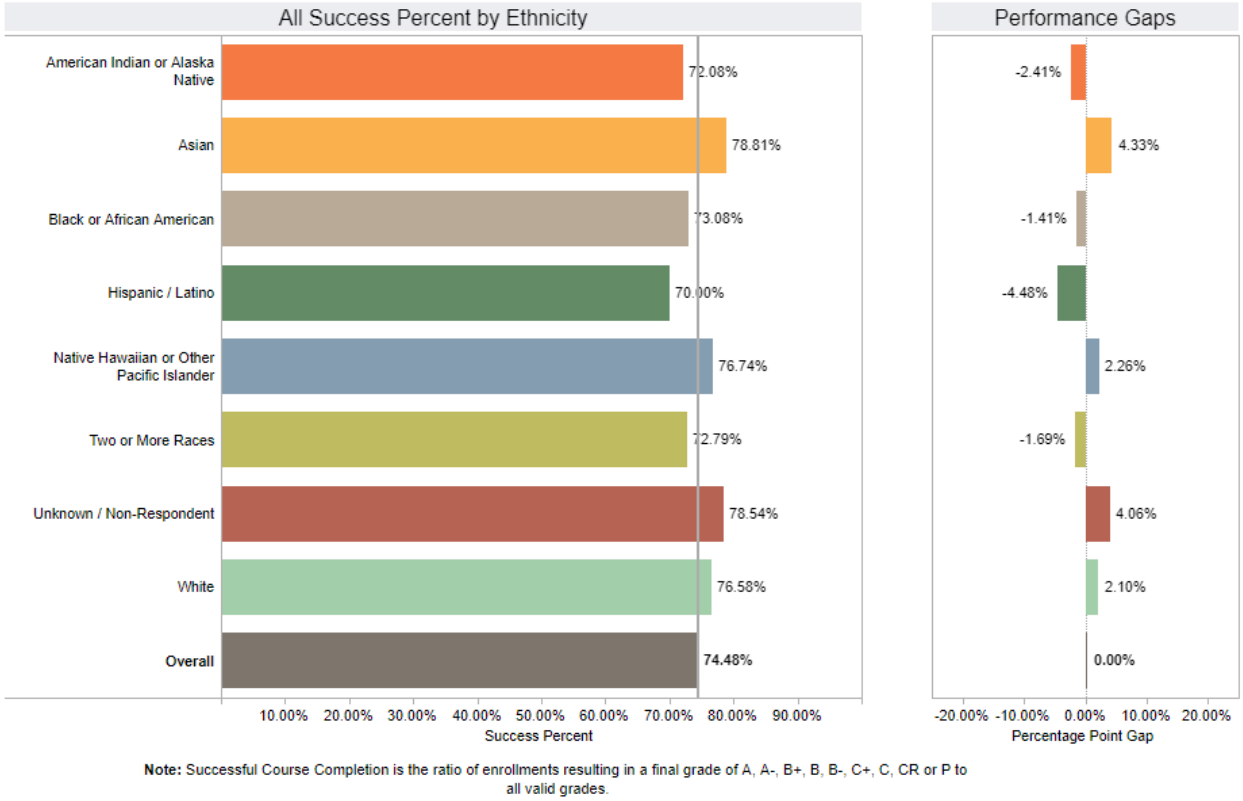
Review the Disaggregated Student Success charts; include any charts that you will reference. Describe any departmental or pedagogical outcomes that have occurred as a result of programmatic discussion regarding the data presented.

Average of Academic Years 13/14-17/18
Number of students in each group:

- Americaln Indian or Alaskan Native: 25
- Asian: 238
- Black or African American: 47
- Hispanic/Latino: 1,557
- Two or More Races: 367
- Unknown: 29
- White: 3,774
- Overall: 6,037



College Data



Note: Successful Course Completion is the ratio of enrollments resulting in a final grade of A, A-, B+, B, B-, C+, C, CR or P to all valid grades.

Chemistry has similar equity gaps that exist in populations at the college. Two chemistry faculty are participating in the college equity project to help improve equity gaps.

- Other Relevant Program Data (optional)

Provide and comment on any other data that is relevant to your program such as state or national certification/licensure exam results, employment data, etc. If necessary, describe origin and/or data collection methods used.
N/A

XII. CURRICULUM REVIEW

C. List all courses and degrees/certificates that have been created, modified, or deactivated (and approved by the Curriculum Committee) since the last CPPR. Complete the Curriulum Review Template and submit the form within your CPPR.

None.

D. Completing the template will provide evidence that the curriculum (including course delivery modalities) has been carefully reviewed during the past five years for currency in teaching practices, compliance with current policies, standards, regulations, and with advisory committee input. The form requires you to include evidence that the following entries on the course outline of record (CurricUNET format) are appropriate and complete:

- Course description
- Student learning outcomes
- Caps
- New DE addendum is complete
- MQDD is complete
- Pre-requisites/co-requisites
- Topics and scope
- Course objectives
- Alignment of topics and scopes, methods of evaluation, and assignments with objectives
- Alignment of SLOs and objectives with approved requirement rubrics (General Education, Diversity, Health, Liberal Arts)
- Textbooks
- CSU/IGETC transfer and AA GE information
- Degree and Certificate information

The template also includes a calendar of a five-year cycle during which all aspects of the course outline of record and program curriculum, including the list above, will be reviewed for currency, quality, and appropriate CurricUNET format.

XIII. PROGRAM OUTCOMES, ASSESSMENT AND IMPROVEMENTS

G. Attach or insert the assessment calendar for your program for the next program review cycle.

CYCLE STAGE	Fall 2016	Sp 2017	Fall 2017	Sp 2018	Fall 2018	Sp 2019	Fall 2019	Sp 2020	Fall 2020
SLO Assessment	*201A* 201B 201X Chem 212A 245 A, B, C *210 FAL*	*201P* *211* Chem 212B 201X	211 210FL 201X 245ABC	*201A* 211 201X 245ABC	210FL	none	201B 212A 201P	201B 212B 201P	*201A* 211 210FL 201X 245ABC
Analyze Results & Plan Improvements			*201P* 201X Chem 212B		*201A* 211 201X 245ABC	*201A* 211 210FL 201X 245ABC	none	none	201B 212A/212B 201P
Plan Implementation			*201P* 201X	Chem 212B			*201A* 211 210FL 201X 245ABC	*201A* 211 245ABC	none

H. Have you completed all course assessments in eLumen? If no, explain why you were unable to do so during this program review cycle and what plan(s) exist for completing this in the next program review cycle.

Yes

I. Include the most recent "PLO Summary Map by Course" from eLumen which shows the Course-level SLOs mapped to the Program-level SLOs.

See attached.

J. Highlight changes made at the course or program level that have resulted from SLO assessment.

- Based on SLO assessments, faculty now review graphs prior to submission in the first experiment in Chem 201B
- Based on SLO assessment, some faculty members have moved scientific notation to online modules in Chem 201A. The module questions contain feedback on incorrect answers.
- Based on SLO assessment, the online tutorial for absorbance spectroscopy in Chem 201A/Chem 201B was changed in include self-assessment questions. This may be converted to a Canvas class to collect data from students.

K. Identify and describe any budget or funding requests that are related to student learning outcome assessment results. If applicable, be sure to include requests in the Resource Plan Worksheet.

XIV. PROGRAM DEVELOPMENT

Indicate how the program supports efforts to achieve any of the following:

D. Institutional Goals and Objectives

Institutional Goal 1 and Objectives 1.1 and 1.2 focus on increasing student success and creating a positive college environment. The Chemistry program strongly supports these Institutional objectives. Chemistry has actively pursued increasing student success with a variety of support mechanisms such as the 201AX/BX, 201P companion courses, the 210FL peer assisted learing program, and the use of embedded tutors.

Institutional Goal 2 focuses on student access to higher education. Chemistry has made an effort to improve access by offering a blended (partially online) Chem 201A course. The department anticipates expanding this to Chem 201B in the future.

E. Institutional Learning Outcomes

Students who complete Chem 210FL, Chem 201A, Chem 201B, Chem 211, Chem 212A, or Chem 212B will meet the following ILOs:

ILO 2 Critical Thinking and Communication

Students in all chemistry courses improve their critical thinking skills by analyzing complex chemistry problems in both lecture and laboratory settings. In the laboratory in particular, students are required to develop experimental plans and molecular-level models to relay chemical information. Students improve their communication skills by answering questions in both sentence and chemical symbol formats. In Chem 212, students practice scientific communication by keeping a laboratory notebook and writing lab reports following the industry-standard American Chemistry Society style.

ILO 3 Scientific and Environmental Understanding

All courses in the chemistry program help students improve scientific understanding. The lab component of chemistry courses is essential for the outcome of drawing conclusions based on the scientific method, computations or experimental and observational evidence. All courses have students construct and analyze statements in a formal symbolic system (chemical symbols).

ILO 6 Technical and Information Fluency

Many of the laboratory experiments in Chem 201A/201B General College Chemistry require students to measure data using computer controlled instrumentation. Students also manipulate and graph data using excel. Most homework is completed through an online homework system, Mastering Chemistry.

F. Program outcomes

The Chemistry PLOs are

1. Communicate chemical concepts
2. Determine the chemical or physical properties of substances
3. Evaluate and interpret numberical and chemical scientific information
4. Solve problems involveing chemical reactions

5. Utilize appropriate experimental apparatus, technology and techniques to safely perform laboratory techniques

All chemistry courses with labs (Chem 210FL, Chem 201A, Chem 201B, Chem 211, Chem 212A, and Chem 212B) support students' advancement in all 5 PLOs. The non-lab classes support students in PLOs 1-4.

Indicate any anticipated changes in the following areas:

E. Curriculum and scheduling
The chemistry department has created a new biochemistry course to help students who are interested in enrolling in medical school, as well as a new Premedical Studies Certificate of Achievement.

The division chair will continue to work with biology, physics, and math to coordinate schedules so that STEM students can take the classes they need without scheduling conflicts.

Enrollment in all courses will continued to be monitored to determine if they number of sections is adequate to meet student demand. Currently, some sections of Chem 201A and Chem 201B are being offered as "triples" (with three lab sections combined to one lecture). This is not ideal for student learning, but is required due to our currently low number of faculty teaching chemistry. This tension in the schedule will be relieved in a few years when faculty members who currently have reassigned time return to teaching full time. In the meantime, more part time faculty would help. However, it can often be challenging to find qualified part time chemistry teachers in San Luis Obispo County.

Currently, there is a desire among some area high schools for us to teach dual enrollment courses at the high school with a Cuesta faculty member delivering content online and the high school teacher supporting the students at the high school site with labs, recitation support, and exam proctoring. If this avenue is to be persued, more full time chemistry faculty will need to be hired.

F. Support services to promote success, persistence and retention
The physical sciences and biology divisions are hoping to create a student space in the 2300 faculty office building, where students can congregate to promote student interaction.

Faculty will continue to learn about equity issues and strive to decrease the equity gap by attending equity workshops.

Through Guided Pathways, the department will work toward promoting incoming students taking Chem 201P in the summer before starting at Cuesta. We will also work toward projects that build community and informal student cohorts among STEM students.

G. Facilities needs

The department is looking forward to improvements in the 2300 and 2400 buildings from Measure L funds. The rooves of the 2100 and 2400 buildings need to be fixed to prevent them from leaking. Room 2401, which is primarily a biology classroom, but is often used for chemistry classes, needs significant upgrades to student work spaces. We are looking forward to the installation of white boards in the hallways of the 2300 faculty office building to facilitate student cooperative work outside of class.

The classrooms in the new 2600 building are not ideal for learning chemistry. The chemistry department will continue to work with Facilities to improve the learning space through efforts such as installing risers so that teachers can reach the top of the white boards, sound dampening devices to reduce echo, and improvements in the audio-visual equipment in the rooms.

H. Staffing needs/projections

At the moment, staffing is low in chemistry faculty. Hiring part-time faculty may help in the short term if qualified chemists apply. The full-time chemistry faculty tend to be very involved in campus-wide efforts resulting in three faculty with reassigned time in areas other than teaching. When these reassignments are completed, this will remove the current stress on staffing levels.

If dual enrollment courses are offered in the high schools with Cuesta faculty delivering content online, then more full time chemistry faculty will need to be hired.

Lastly, address any changes in strategy in response to the predicted budget and FTES target for the next program review cycle.

We have communicated with the administration some strategies to increase the number of FTES served and maximize revenue generated using the new funding formula. These include offering sections at local area high schools. We have not received the required support to expand this program beyond the current level of offerings.

XV. END NOTES

If applicable, you may attach additional documents or information, such as awards, grants, letters, samples, lists of students working in the field, etc.

XVI. After completing and submitting this document, please complete the Overall Program Strength and Ongoing Viability Assessment with your Dean before May 15, 2018.

SIGNATURE PAGE

Faculty, Director(s), Manager(s), and/or Staff Associated with the Program

Instructional Programs: All full-time faculty in the program must sign this form. If needed, provide an extra signature line for each additional full-time faculty member in the program. If there is no full-time faculty associated with the program, then the part-time faculty in the program should sign. If applicable, please indicate lead faculty member for program after printing his/her name.

Student Services and Administrative Services Programs: All full-time director(s), managers, faculty and/or classified staff in the program must sign this form. (More signature lines may be added as needed.)

Division Chair/Director Name	Signature	Date
Name	Signature	Date
Name	Signature	Date
Name	Signature	Date
Name	Signature	Date
Name	Signature	Date
Name	Signature	Date

SUPPLEMENTAL DOCUMENTS

FACULTY HIRING PRIORITIZATION INFORMATION (IF APPLICABLE)

If your program requested a faculty position for consideration, please attach or embed the following worksheets that were presented to the College Council. The guidelines for faculty prioritization can be found here: https://cuestacollege.sharepoint.com/Committees/IPPR/Committee%20Documents?viewpath=%2FCommittees%2FIPPR%2FCommittee%20Documents&id=%2FCommittees%2FIPPR%2FCommittee%20Documents%2FPrioritization%20Process%20Handbook%20Sept%5F25%5F2018%2Epdf&parent=%2FCommittees%2FIPPR%2FCommittee%20Documents

APPLICABLE SIGNATURES:

Vice President/Dean	**Date**
Division Chair/Director/Designee	**Date**
Other (when applicable)	**Date**

The above-signed individuals have read and discussed this review. The Director/Coordinator, Faculty, and staff in the program involved in the preparation of the CPPR acknowledge the receipt of a copy of the Vice President/ Dean's narrative analysis. The signatures do not necessarily signify agreement.

CURRICULUM REVIEW GUIDE and WORKSHEET
Courses and Programs

Current Review Date ____2/24/2019_____

Reviewer _Alex Kahane_____

1. Courses

- List all courses, which were active in your program at the time of the last CPPR.
- Review the current CurricUNET Course Outline of Record (COR) for each course and indicate yes/no for each column below.
- For each new, modified, and deactivated course provide the effective term posted on CurricUNET.

Course (Prefix / Number)	Currently active	New course since last CPPR	Major modification since last CPPR	Minor modification since last CPPR	Deactivated since last CPPR Notified impacted program(s)*
CHEM 201A	yes / no	no / yes: date	no / yes: date	no / yes: date	no / yes: date
CHEM 201AX (formerly 201X)	yes / no	no / yes: date	no / yes: date 4/3/2015	no / yes: date 12/2/2016	no / yes: date
CHEM 201B	yes / no	no / yes: date	no / yes: date	no / yes: date	no / yes: date
CHEM 201BX	yes / no	no / yes: date S2019	no / yes: date	no / yes: date	no / yes: date
CHEM 201P	yes / no	no / yes: date F2015	no / yes: date	no / yes: date	no / yes: date
CHEM 210FL	yes / no	no / yes: date	no / yes: date	no / yes: date	no / yes: date
CHEM 211	yes / no	no / yes: date	no / yes: date 5/1/2015	no / yes: date	no / yes: date
CHEM 212A	yes / no	no / yes: date	no / yes: date 11/4/2016	no / yes: date	no / yes: date
CHEM 212B	yes / no	no / yes: date	no / yes: date 11/4/2016	no / yes: date	no / yes: date
CHEM 245A	yes / no	no / yes: date	no / yes: date	no / yes: date	no / yes: date
CHEM 245B	yes / no	no / yes: date	no / yes: date	no / yes: date	no / yes: date
CHEM 245C	yes / no	no /	no /	no /	no /

		yes: date	yes: date	yes: date	yes: date

*Note: Please state if the deactivated course impacted any other program(s) and if and when the affected program(s) was/were notified:

Deactivated Course	Impacted Program (s)	Date affected program was notified

2. Course Review

- Please review the current CurricUNET CORs for all active courses in your program for currency and accuracy and annotate the items below.
- If you find any mistakes in the CORs (e.g. non-content related items such as typos), contact the Curriculum Chair or Curriculum Specialist for correction.
- All other changes require either a minor or major modification. Your curriculum representative will assist you.
- Some modifications need to be processed in the current term (see annotations # 2 and #3 below).
- Some modifications can be done over the period of the next five years (see annotation #1 below).
- Indicate on the Five-Year Cycle Calendar below when a minor or major modification will be submitted.

Course Number	201A	201AX	201B	201BX
1. Effective term listed on COR	Date: F2014	Date: F2018	Date: F2017	Date: S2018
2. Catalog / schedule description is appropriate	yes / no[1]	yes / no[1]	yes / no[1]	yes / no[1]
3. Pre-/ co-requisites / advisories (if applicable) are appropriate	yes / no[2]	yes / no[2]	yes / no[2]	yes / no[2]
4. "Approved as Distance Education" is accurate (and new addendum complete)	yes / no[4] Part of Pilot; not listed?	yes / no[4]	yes / no[4]	yes / no[4]
5. Grading Method is accurate	yes / no[1]	yes / no[1]	yes / no[1]	yes / no[1]
6. Repeatability is zero	yes / no[4]	yes / no[4]	yes / no[4]	yes / no[4]
7. Class Size is accurate	yes / no[2]	yes / no[2]	yes / no[2]	yes / no[2]
8. Objectives are aligned with methods of evaluation	yes / no[1]	yes / no[1]	yes / no[1]	yes / no[1]
9. Topics / scope are aligned with objectives	yes / no[1]	yes / no[1]	yes / no[1]	yes / no[1]
10. Assignments are aligned with objectives	yes / no[1]	yes / no[1]	yes / no[1]	yes / no[1]
11. Methods of evaluation are appropriate	yes / no[1]	yes / no[1]	yes / no[1]	yes / no[1]
12. Texts, readings, materials are dated within last 5 years	yes / no[3] 2014/2013	yes / no[3] 2014	yes / no[3] 2014/2013	yes / no[3] 2017
13. CSU / IGETC transfer & AA GE information (if applicable) is correct	yes / no[4]	yes / no[4]	yes / no[4]	yes / no[4]
14. Degree / Certificate information (if applicable) is correct	yes / no[4]	yes / no[4]	yes / no[4]	yes / no[4]

15. Course Student Learning Outcomes are accurate	yes / no[4]	yes / no[4]	yes / no[4]	yes / no[4]
16. Library materials are adequate and current *	yes / no[1]	yes / no[1]	yes / no[1]	yes / no[1]

Course Number	201P	210FL	211	212A
1. Effective term listed on COR	Date: F2017	Date: F2018	Date: S2016	Date: F2017
2. Catalog / schedule description is appropriate	yes / no[1]	yes / no[1]	yes / no[1]	yes / no[1]
3. Pre-/ co-requisites / advisories (if applicable) are appropriate	yes / no[2]	yes / no[2]	yes / no[2]	yes / no[2]
4. "Approved as Distance Education" is accurate (and new addendum complete)	yes / no[4]	yes / no[4]	yes / no[4]	yes / no[4]
5. Grading Method is accurate	yes / no[1]	yes / no[1]	yes / no[1]	yes / no[1]
6. Repeatability is zero	yes / no[4]	yes / no[4]	yes / no[4]	yes / no[4]
7. Class Size is accurate	yes / no[2]	yes / no[2]	yes / no[2]	yes / no[2]
8. Objectives are aligned with methods of evaluation	yes / no[1]	yes / no[1]	yes / no[1]	yes / no[1]
9. Topics / scope are aligned with objectives	yes / no[1]	yes / no[1]	yes / no[1]	yes / no[1]
10. Assignments are aligned with objectives	yes / no[1]	yes / no[1]	yes / no[1]	yes / no[1]
11. Methods of evaluation are appropriate	yes / no[1]	yes / no[1]	yes / no[1]	yes / no[1]
12. Texts, readings, materials are dated within last 5 years	yes / no[3] 2014	yes / no[3] 2016/2017	yes / no[3] 2013/2009/2015	yes / no[3] 2013/2017
13. CSU / IGETC transfer & AA GE information (if applicable) is correct	yes / no[4]	yes / no[4]	yes / no[4]	yes / no[4]
14. Degree / Certificate information (if applicable) is correct	yes / no[4]	yes / no[4]	yes / no[4]	yes / no[4]
15. Course Student Learning Outcomes are accurate	yes / no[4]	yes / no[4]	yes / no[4]	yes / no[4]
16. Library materials are adequate and current *	yes / no[1]	yes / no[1]	yes / no[1]	yes / no[1]

Course Number	212B	245A	245B	245C
1. Effective term listed on COR	Date: F2017	Date: S2018	Date: S2018	Date: S2018
2. Catalog / schedule description is appropriate	yes / no[1]	yes / no[1]	yes / no[1]	yes / no[1]
3. Pre-/ co-requisites / advisories (if applicable) are appropriate	yes / no[2]	yes / no[2]	yes / no[2]	yes / no[2]
4. "Approved as Distance Education" is accurate (and new addendum complete)	yes / no[4]	yes / no[4]	yes / no[4]	yes / no[4]
5. Grading Method is accurate	yes / no[1]	yes / no[1]	yes / no[1]	yes / no[1]
6. Repeatability is zero	yes / no[4]	yes / no[4]	yes / no[4]	yes / no[4]
7. Class Size is accurate	yes / no[2]	yes / no[2]	yes / no[2]	yes / no[2]
8. Objectives are aligned with methods of evaluation	yes / no[1]	yes / no[1]	yes / no[1]	yes / no[1]

9. Topics / scope are aligned with objectives	yes / no[1]	yes / no[1]	yes / no[1]	yes / no[1]
10. Assignments are aligned with objectives	yes / no[1]	yes / no[1]	yes / no[1]	yes / no[1]
11. Methods of evaluation are appropriate	yes / no[1]	yes / no[1]	yes / no[1]	yes / no[1]
12. Texts, readings, materials are dated within last 5 years	yes / no[3] 2013/2017	yes / no[3] 2013	yes / no[3] 2013	yes / no[3] 2013
13. CSU / IGETC transfer & AA GE information (if applicable) is correct	yes / no[4]	yes / no[4]	yes / no[4]	yes / no[4]
14. Degree / Certificate information (if applicable) is correct	yes / no[4]	yes / no[4]	yes / no[4]	yes / no[4]
15. Course Student Learning Outcomes are accurate	yes / no[4]	yes / no[4]	yes / no[4]	yes / no[4]
16. Library materials are adequate and current *	yes / no[1]	yes / no[1]	yes / no[1]	yes / no[1]

[1] If no, a major modification is needed within the next 5 years (see five-year cycle calendar).
[2] If no, a major modification is needed in the current term. (For increase in class size, see your curriculum representative for details.)
[3] If no, a minor modification is needed in the current term.
[4] If no, contact the Curriculum Chair or Curriculum Specialist.

3. Programs

- List all programs/certificates that were active at the time of the last CPPR.
- Review the CurricUNET "Program of Study" outline and indicate yes/no for each program/certificate.
- For each deactivated program provide the effective term posted on CurricUNET.

Program / Certificate Title	Currently active	New program since last CPPR	Program modification since last CPPR	Deactivated since last CPPR
Chemistry AS	yes / no	no / yes: date	no / yes: date 11/4/2016; change became active 2018-2019	no / yes: date
	yes / no	no / yes: date	no / yes: date	no / yes: date
	yes / no	no /	no /	no /

		yes: date	yes: date	yes: date
	yes / no	no / yes: date	no / yes: date	no / yes: date
	yes / no	no / yes: date	no / yes: date	no / yes: date
	yes / no	no / yes: date	no / yes: date	no / yes: date

4. Program Review

- Review the CurricUNET "Program of Study" outline for each active program/certificate and indicate yes/no for each column below.

Currently active Program / Certificate: Title	Required courses and electives, incl. course numbers, course titles, and course credits, are accurate	Program description is current	Program Learning Outcomes are accurate and include method of assessment
Chemistry AS	yes / no*	yes / no*	yes / no**
	yes / no*	yes / no*	yes / no**
	yes / no*	yes / no*	yes / no**
	yes / no*	yes / no*	yes / no**
	yes / no*	yes / no*	yes / no**
	yes / no*	yes / no*	yes / no**

* If not, program modification is needed.

** If not, Program Learning Outcomes modification is needed.

5. Five-Year Cycle Calendar

- During the following five-year cycle all aspects of the course outline of record and program curriculum will be reviewed for currency, quality, and appropriate CurricUNET format.
- Indicate if a course needs a major or minor modification based on the current course review. Your curriculum representative will assist you.
- When submitting a major or minor modification, please enter or update the Student Learning Outcomes for each course.

COURSES

Course Number	Spring 2019	Fall 2019	Spring 2020	Fall 2020	Spring 2021	Fall 2021	Spring 2022	Fall 2022	Spring 2023
201A	major / minor	major / minor	major / minor	major / minor	major / minor	major / minor	major / minor	major / minor	major / minor

201AX	major / minor	major / minor	major / minor	major / minor	major / minor	major / minor	major / minor	major / minor	major / minor
201B	major / minor	major / minor	major / minor	major / minor	major / minor	major / minor	major / minor	major / minor	major / minor
201BX	major / minor	major / minor	major / minor	major / minor	major / minor	major / minor	major / minor	major / minor	major / minor
201P	major / minor	major / minor	major / minor	major / minor	major / minor	major / minor	major / minor	major / minor	major / minor
210FL	major / minor	major / minor	major / minor	major / minor	major / minor	major / minor	major / minor	major / minor	major / minor
211	major / minor	major / minor	major / minor	major / minor	major / minor	major / minor	major / minor	major / minor	major / minor
212A	major / minor	major / minor	major / minor	major / minor	major / minor	major / minor	major / minor	major / minor	major / minor
212B	major / minor	major / minor	major / minor	major / minor	major / minor	major / minor	major / minor	major / minor	major / minor
245A	major / minor	major / minor	major / minor	major / minor	major / minor	major / minor	major / minor	major / minor	major / minor
245B	major / minor	major / minor	major / minor	major / minor	major / minor	major / minor	major / minor	major / minor	major / minor
245C	major / minor	major / minor	major / minor	major / minor	major / minor	major / minor	major / minor	major / minor	major / minor

PROGRAMS / CERTIFICATES

Program/Certificate Title	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring
Chemistry AS		modify	modify	modify	modify	modify	modify	modify	modify	modify
		modify	modify	modify	modify	modify	modify	modify	modify	modify
		modify	modify	modify	modify	modify	modify	modify	modify	modify
		modify	modify	modify	modify	modify	modify	modify	modify	modify

cm revised 11/08/16

ILO/PLO Summary Map by Course/Context

Map Origin: Courses for Chemistry

Map Target: AS_CHEMISTRY

AS_CHEMISTRY SLOs	AS_CHEMISTRY				
	Communicate chemical concepts.	Determine the chemical or physical properties of substances.	Evaluate and interpret numerical and chemical scientific information.	Solve problems involving chemical reactions.	Utilize appropriate experimental apparatus, technology, and techniques to safely perform laboratory experiments.
CHEM201A					
Communicate chemical concepts through the use of molecular formulas, structural formulas, and names of compounds.	X				
Describe the chemical and physical properties of a chemical substance based on the atomic and molecular structure including orbital theory, the type of chemical bond, and the shape of the molecule.	X	X			
Evaluate and interpret numerical and chemical scientific information.			X		
Perform laboratory experiments based on gravimetric, volumetric, qualitative and instrumental analysis techniques, and effectively utilize the appropriate experimental apparatus.	X	X	X	X	X
Solve stoichiometry problems, including mass/mass, mass/volume, and volume/volume relationships.				X	
CHEM201AX					
CHEM201B					

AS_CHEMISTRY SLOs	AS_CHEMISTRY				
	Communicate chemical concepts.	Determine the chemical or physical properties of substances.	Evaluate and interpret numerical and chemical scientific information.	Solve problems involving chemical reactions.	Utilize appropriate experimental apparatus, technology, and techniques to safely perform laboratory experiments.
Use chemical evidence to develop a qualitative analysis scheme, and use the scheme for the determination of unknown cations in solution					
Evaluate and interpret numerical and chemical scientific information, including the determination of a rate law or equilibrium constant based on experimental data.			X	X	
Solve mathematical problems in chemistry, including equilibrium calculations, kinetics, electrochemistry, and energetics.			X	X	
Communicate chemical concepts through the use of molecular formulas, structural formulas, and names of compounds.	X				
Perform laboratory experiments based on qualitative, gravimetric, volumetric, and instrumental analysis techniques and effectively utilize the appropriate experimental apparatus and technology.	X	X	X	X	X
CHEM201BX					
CHEM201P					
Solve numerical and unit conversion problems with correct units and significant figures.					
Solve problems related to chemical stoichiometry.					
Demonstrate proficiency in chemical nomenclature.					

AS_CHEMISTRY SLOs	AS_CHEMISTRY				
	Communicate chemical concepts.	Determine the chemical or physical properties of substances.	Evaluate and interpret numerical and chemical scientific information.	Solve problems involving chemical reactions.	Utilize appropriate experimental apparatus, technology, and techniques to safely perform laboratory experiments.
CHEM201X					
Solve general chemistry problems that contain cumulative or integrated concepts.					
Create problem solving pathways based on their analysis of data or measured values provided in chemistry questions.					
CHEM210FL					
Communicate chemical concepts through the use of molecular formulas, structural formulas, and names of compounds.	X				
Describe the chemical and physical properties of matter based on atomic structure and types of compounds.	X	X			
Discuss and solve chemistry problems with peers in Facilitator Assisted Learning sessions.	X	X	X	X	
Perform chemical calculations using dimensional analysis.			X	X	
Safely perform laboratory experiments using the appropriate experimental apparatus and analyze data obtained.	X	X	X	X	X
CHEM211					
Communicate the language of organic chemistry using i IUPAC nomenclature and representations of molecules.					

AS_CHEMISTRY SLOs	AS_CHEMISTRY				
	Communicate chemical concepts.	Determine the chemical or physical properties of substances.	Evaluate and interpret numerical and chemical scientific information.	Solve problems involving chemical reactions.	Utilize appropriate experimental apparatus, technology, and techniques to safely perform laboratory experiments.
Describe and predict products of reactions of hydrocarbons and functional groups.					
Describe the composition and function(s) of biochemical pathways.					
Predict the physical and chemical properties of organic and biochemical molecules.					
Safely perform organic and biochemical laboratory experiments utilizing appropriate apparatus and techniques.					
CHEM212A					
Describe the chemistry and physical properties of hydrocarbons and functional groups.	X	X	X		
Predict products and write mechanisms of organic reactions.	X			X	
Safely perform organic chemistry lab experiments utilizing appropriate apparatus and techniques and critically interpret data in the laboratory notebook.	X	X	X	X	X
Write names and structures of hydrocarbons and functional groups including conformations and stereoisomers.	X				
CHEM212B					
Deduce molecular structure and experimental product purity using spectroscopic techniques.	X	X	X		X

AS_CHEMISTRY SLOs	AS_CHEMISTRY				
	Communicate chemical concepts.	Determine the chemical or physical properties of substances.	Evaluate and interpret numerical and chemical scientific information.	Solve problems involving chemical reactions.	Utilize appropriate experimental apparatus, technology, and techniques to safely perform laboratory experiments.
Predict the products and write the mechanisms of organic chemical reactions.	X			X	
Propose multi-step syntheses using retrosynthetic analysis.	X		X	X	
Safely perform organic chemistry lab experiments utilizing appropriate apparatus and glassware.	X	X	X	X	X
CHEM245A					
Assist Introductory Chemistry st udents in Chemistry problem-solving techniques.					
Clarify course content in order to assist introductory Chemistry st udents.					
Describe basic cooperative lear ning, peer tutoring, and listening skills.					
Discuss and model study habits and time management skills app licable to science classes.					
Practice responsibilities associat ed with assisting students and m anaging college property.					
CHEM245B					
Analyze cooperative learning, peer tutoring and listening techniques					
Practice responsibilities associat ed with assisting students and managing college property					
Assist Introductory Chemistry st udents in Chemistry problem-solving techniques at an advanced level					

AS_CHEMISTRY SLOs	AS_CHEMISTRY				
	Communicate chemical concepts.	Determine the chemical or physical properties of substances.	Evaluate and interpret numerical and chemical scientific information.	Solve problems involving chemical reactions.	Utilize appropriate experimental apparatus, technology, and techniques to safely perform laboratory experiments.
Suggest and discuss study habits and time management skills applicable to science classes					
Clarify course content in order to assist introductory Chemistry students					
CHEM245C					
Demonstrate the characteristics and actions necessary for being an effective mentor.					
Assess the effectiveness of cooperative learning, peer tutoring and listening techniques in order to improve facilitator performance.					
Practice responsibilities associated with assisting students and managing college property					
Assist Introductory Chemistry students in Chemistry problem-solving techniques at an advanced level					
Suggest and discuss study habits and time management skills applicable to science classes					
Clarify course content in order to assist introductory Chemistry students					

INSTRUCTIONAL COMPREHENSIVE PROGRAM PLANNING AND REVIEW (CPPR) FOR 2019

Only to be completed by those programs scheduled for the year according to the institutional comprehensive planning cycle for instructional programs (i.e., every four years for CTE programs and five years for all other instructional programs), which is produced by the Office of Academic Affairs. Faculty should meet with their dean prior to beginning this process. Training is available to support faculty completing this work.

Cluster: Math and Sciences
Program:

Current Academic Year: 2018-2019

Last Academic Year CPPR Completed: 2014-2015

Current Date: March 2019

NARRATIVE: INSTRUCTIONAL CPPR

Please use the following narrative outline:

XVII. GENERAL PROGRAM INFORMATION

K. Program mission (optional)

The mission of the Physics Program, which is part of the Physical Sciences Division, is to support the Mission of Cuesta College by enabling our students to achieve their academic, transfer, workforce preparation, career advancement, and personal goals. We provide preparation for transfer students who are required to take a general science course with or without a laboratory. The program also presents an excellent opportunity for students wishing to enhance their general education and scientific knowledge. The physics department is committed to integrating appropriate technology, modern instrumentation, traditional and contemporary pedagogical approaches, and assessment of student learning into classes to create a supportive environment that engages all students in classroom activities.

L. Brief history of the program

The Physics Program started out with a complex combination of trig level and calculus level courses being taught with common lectures that were at a trigonometry level, then the calculus level courses had additional lectures to handle the more mathematical aspects of the physics sequence. We had open labs where anyone could attend at any time during any lab period to do their labs, and the lab was a separate unit. We decoupled the trig and calculus level courses in 1999, and constructed the calculus level sequence with two 5 unit classes (Physics 208A and Physics 208B with the labs included), and added a 3 unit modern physics class without a lab. Recently, we have added a lab to the modtern physics class (Physics 208C) and it is now a 4 unit course. The trig level courses (Physics 205A and Physics 205B) are 4 unit classes with the lab included.

M. Include significant changes/improvements since the last Program Review

Since the last Comprehensive Program Plan and Review, a laboratory component for the Physics 208C course was developed, with an expansion in topic coverage to increase the class credit to 4 units. This change satisfied the C-ID descriptors to facilitate the transfer of the modern physics portion of the Physics 208ABC sequence to the California State University and University of California systems. This capstone course is required to complete the Associate's Degree for Transfer in Physics. Also, we believe that this will allow for more time to cover each subject, as well as give the students a hands on experience to the many abstract subjects covered in modern physics, and will translate to greater student success in the entire Physics Program.

N. List current faculty, including part-time faculty

James Eickemeyer (full-time)
Patrick M. Len (full-time)
Bret Clark (full-time)
Joseph McDermott (part-time)
Michelle Kaul (part-time)
Jon Tarantino (part-time)
Richard Fryer (part-time)

O. Describe how the Program Review was conducted and who was involved

All program faculty were invited to participate in this Comprehensive Program Plan and Review. The narrative and analysis were primarily completed by Jim Eickemeyer (full-time), Patrick Len (full-time) and Bret Clark (full-time). Input was also gathered from our lab technician, Mark Sparlin, who assisted in identifying future program needs for the Resource Allocation Plan.

XVIII. PROGRAM SUPPORT OF DISTRICT'S MISSION STATEMENT, INSTITUTIONAL GOALS, INSTITUTIONAL OBJECTIVES, AND/OR INSTITUTIONAL LEARNING OUTCOMES

G. Identify how your program addresses or helps to achieve the District's Mission Statement.

The Physics Program supports the District's Mission by providing instruction so students may meet their education goals by providing foundational skills that is useful for all STEM majors. The Program offers challenging courses while promoting intellectual, personal, and professional growth.

H. Identify how your program addresses or helps to achieve the District's Institutional Goals and Objectives, and/or operational planning initiatives.

Institutional Goal 1: San Luis Obispo County Community College District will enhance its programs and services to promote students' successful completion of transfer requirements, degrees, certificates, and courses.

The Physics Program will strive to increase retention and success through improved teaching and assessment. The program is committed to the goal of providing multiple opportunties for students taking Physics 208ABC, Physics 205AB with a variety of convenient lecture and lab times offered. A comprehensive evaluation of disciplinary scheduling has greatly reduced class conflicts and has promoted student access to these courses from many disciplines each semester.

Institutional Goal 2: San Luis Obispo County Community College District will build a sustainable base of enrollment by effectively responding to the needs of its local service area.

The Physics Program offers opportunities for students to take courses at the San Luis Obispo campus, during daytime and evening hours, and during the summer session as demand requires.

I. Identify how your program helps students achieve Institutional Learning Outcomes.

ILO 2. Critical Thinking and Communication
Students achieving this outcome will be able to:
Analyze and evaluate their own thinking processes and those of others
Communicate and interpret complex information in a clear, ethical, and logical manner

To help students achieve ILO 2 in Physics 205AB and Physics 208ABC, students apply appropriate physics concepts to analyze real-world situations.

http://waiferx.blogspot.com/search/label/physics%20problem
http://waiferx.blogspot.com/search/label/physics%20essay%20question

ILO 3. Scientific and Environmental Understanding
Students achieving this outcome will be able to:

Draw conclusions based on the scientific method, computations or experimental and observational evidence

ILO 6. Technical and Informational Fluency

Students achieving this outcome will be able to:

Recognize when information is needed, and be able to locate and utilize diverse sources effectively and ethically

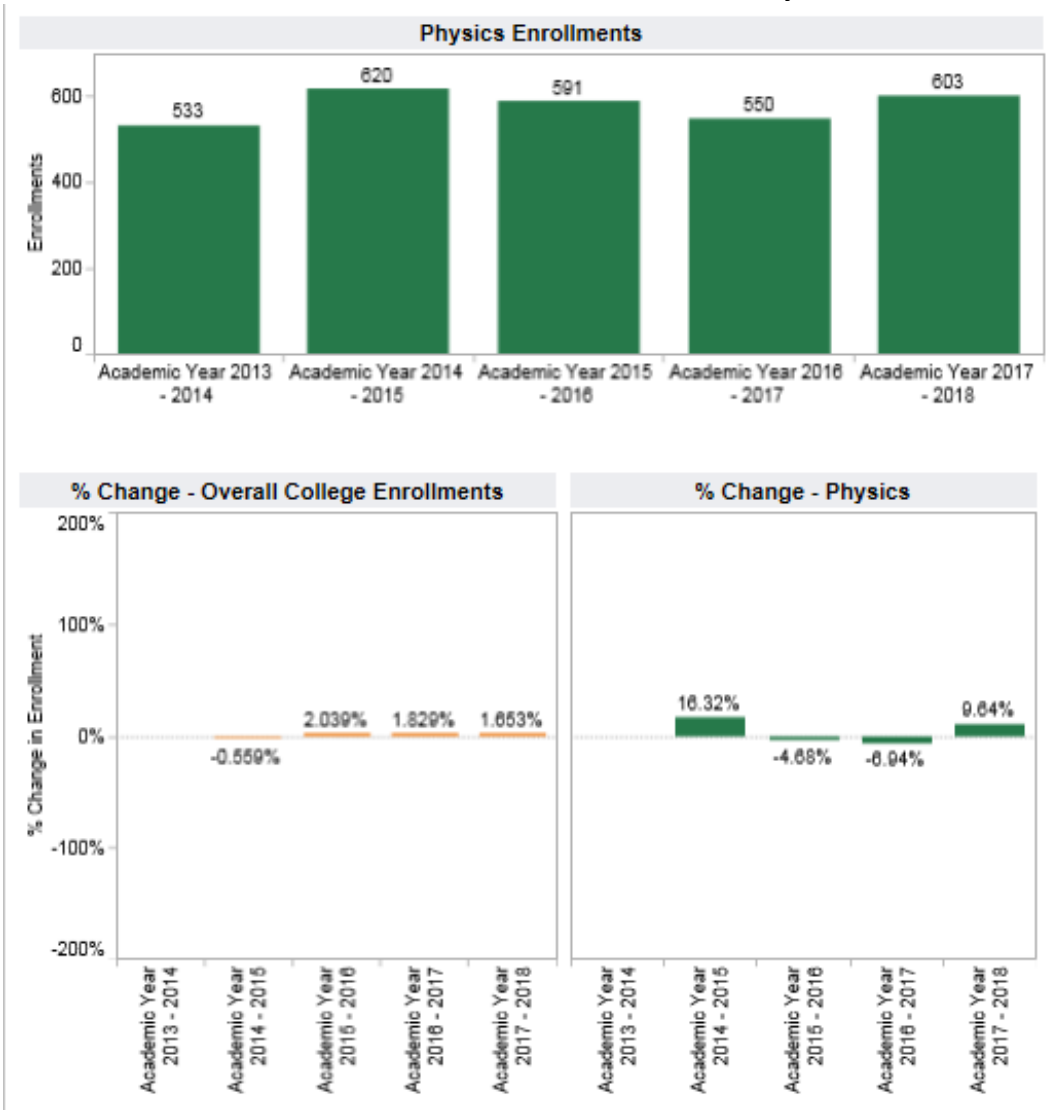
Produce and share electronic documents, images, and projects using modern software and technology

To help students achieve ILO 3 and ILO 6 in Physics 205AB and Physics 208ABC, students learn how develop and/or execute procedures to gather evidence in order to analyze the underlying physics concepts in laboratory.

XIX. PROGRAM DATA ANALYSIS AND PROGRAM-SPECIFIC MEASUREMENTS

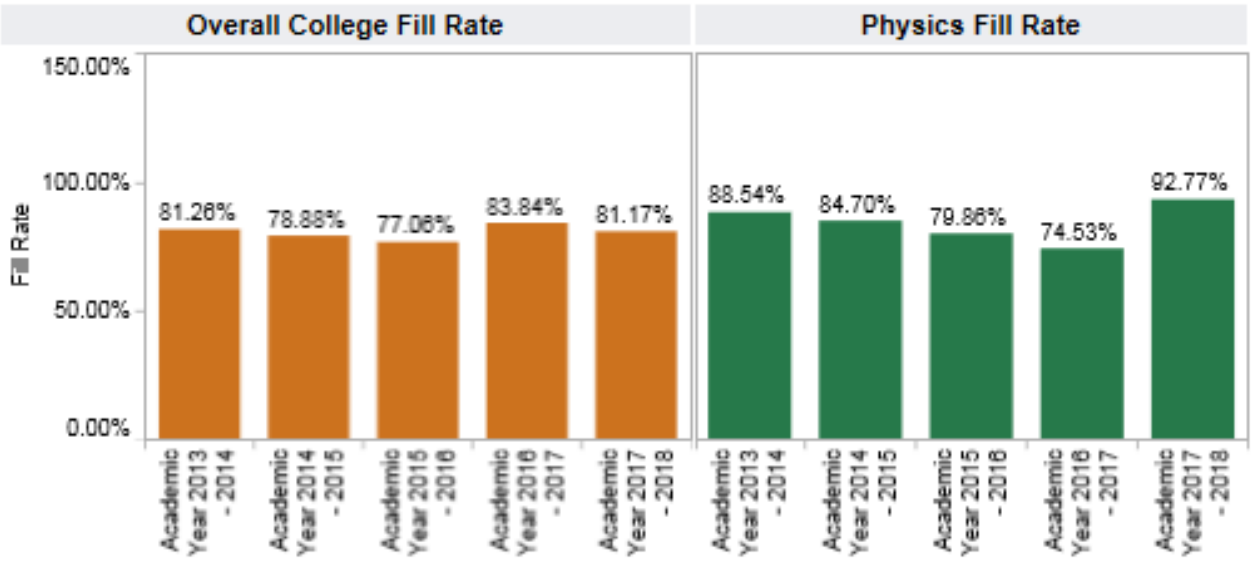
General Enrollment:

Historical Enrollment for All Physics Courses



Physics enrollments have varied during the program review cycle, but are trending flat. This is better that the college face-to-face enrollment trend which is decreasing. Currently, most of our sections are face-to-face, although there is a pilot Dual Enrollment program at Templeton High School where PHYS 205A and PHYS 205B will be offered in the distance education modality. This program is currently in it's second year and has been highly successful so far. Last year, 52 students participated in this program. This accounts for the 33% increase year-over-year in PHYS 205A enrollments. If this program is replicated, it should increase Physics enrollments in future program cycles.

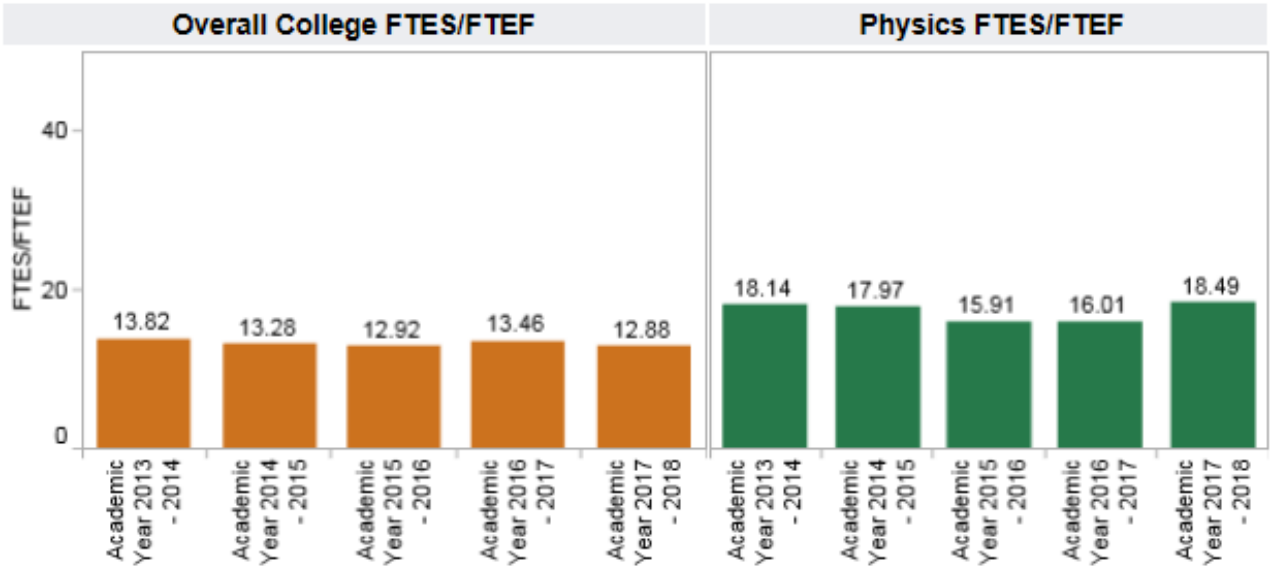
General Student Demand (Fill Rate)



Fill Rate: The ratio of enrollments to class limits. Cross listed class limits are adjusted appropriately. Also, courses with zero class limits are excluded from this measure.

Looking at the overall physics fill rate, there is a spike in the 2017-18 data. The year-over-year change is likely due to the addition of the Dual Enrollment PHYS 205A sections.

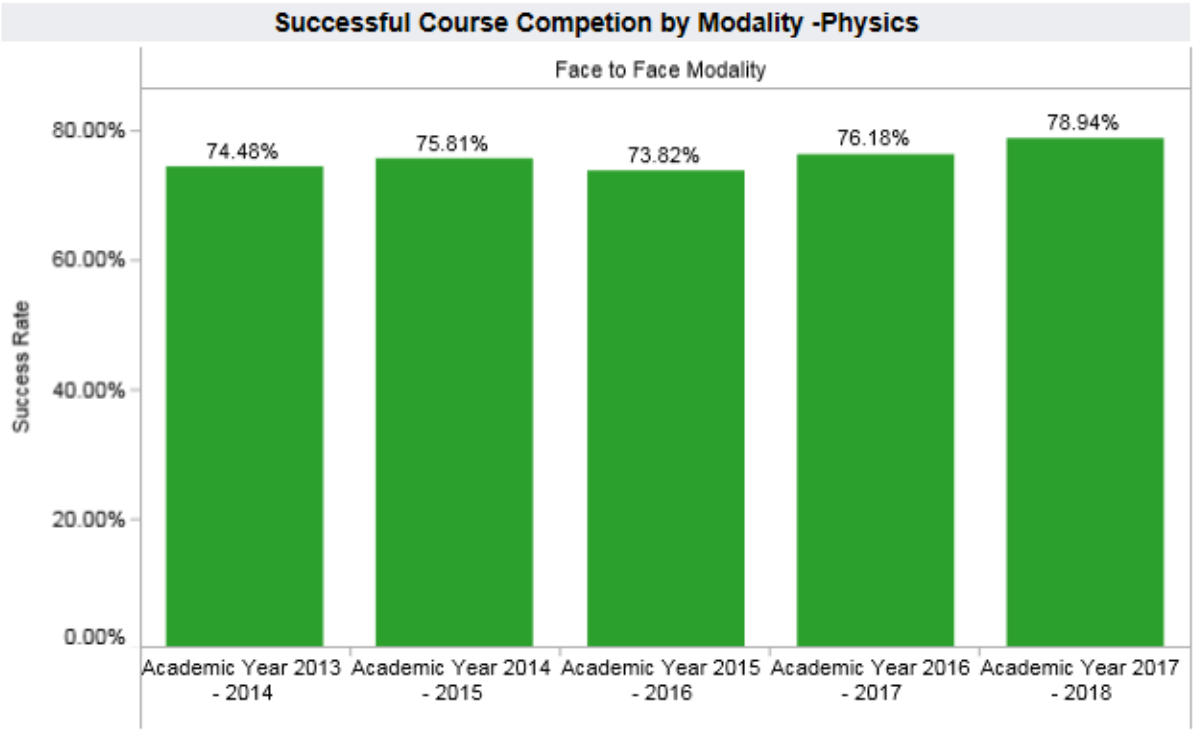
General Efficiency (FTES/FTEF) (Insert Aggregated Data Chart)



FTES/FTEF: The ratio of total FTES to Full-Time Equivalent Faculty
(SXD4 Total-Hours/17.5)/XE03 FACULTY-ASSIGNMENT-FTE)

Looking at the overall physics efficiency, there is a spike in the 2017-18 data. The year-over-year change is likely due to the addition of the Dual Enrollment PHYS 205A sections, and the collapsing of smaller (40 student lectures) into larger (60+ student) lectures.

[Student Success—Course Modality (Insert Data Chart)]

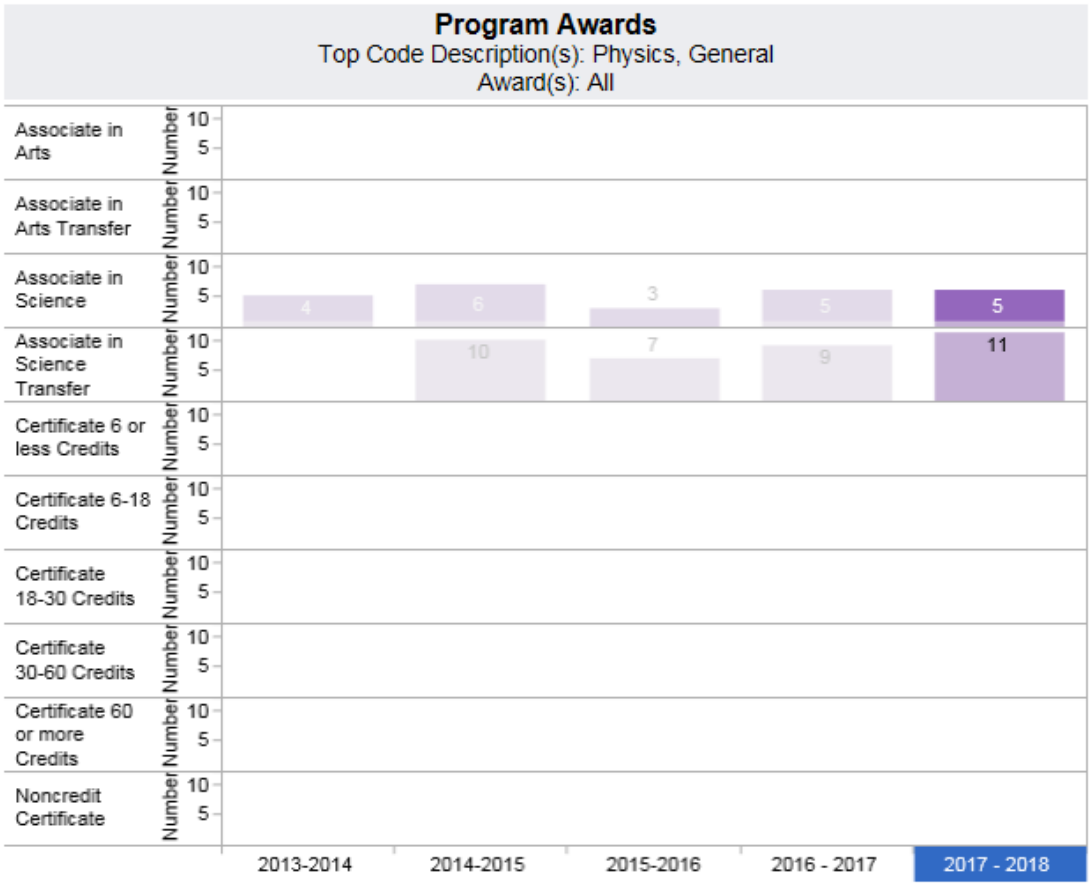


Successful Course Competion by Modality Table - Physics

		Academic Year 2013 - 2014	Academic Year 2014 - 2015	Academic Year 2015 - 2016	Academic Year 2016 - 2017	Academic Year 2017 - 2018
Face to Face Modality	Department Success Rate	74.48%	75.81%	73.82%	76.18%	78.94%
	Total Department Enrollments	533.0	620.0	592.0	550.0	603.0

Success rates have improved slightly during the reporting period. We continue to offer problem solving courses to supplement the instruction for PHYS 208A and PHYS 208B. It should be noted that the success rate in the Dual Enrollment PHYS 205A sections is much higher than the average for and physics sections. These are some factors that have caused this change.

[Degrees and Certificates Awarded (Insert Data Chart)]



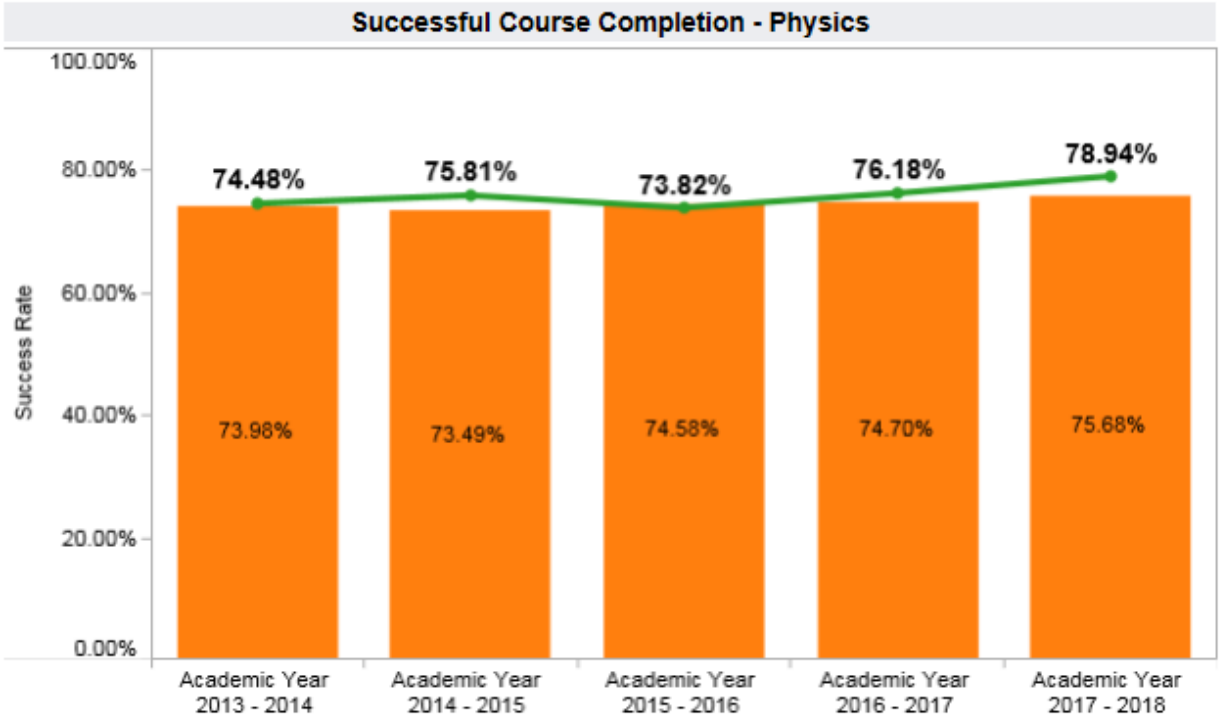
Program Awards Table

Award T..	Award	2013-2014	2014-2015	2015-2016	2016 - 2017	2017 - 2018
Associate in Science	Physics (AS)	4	6	3	5	5
	Physics (AST)	1	1		1	1
	Total	5	7	3	6	6
Associate in Scienc..	Physics (AST)		10	7	9	11
	Total		10	7	9	11

Program Awards: The number of degress and certificates awarded by program type

The sample size is too small to make any generalizations about a perceived increase in the number of students achieving an Associate's Degree. Most of the engineering students complete the degree requirements for an Associate Degree for Transfer, but do not apply for it. If the District starts to auto-award degrees, this number should increase significantly.

General Student Success – Course Completion (Insert Aggregated Data Chart)

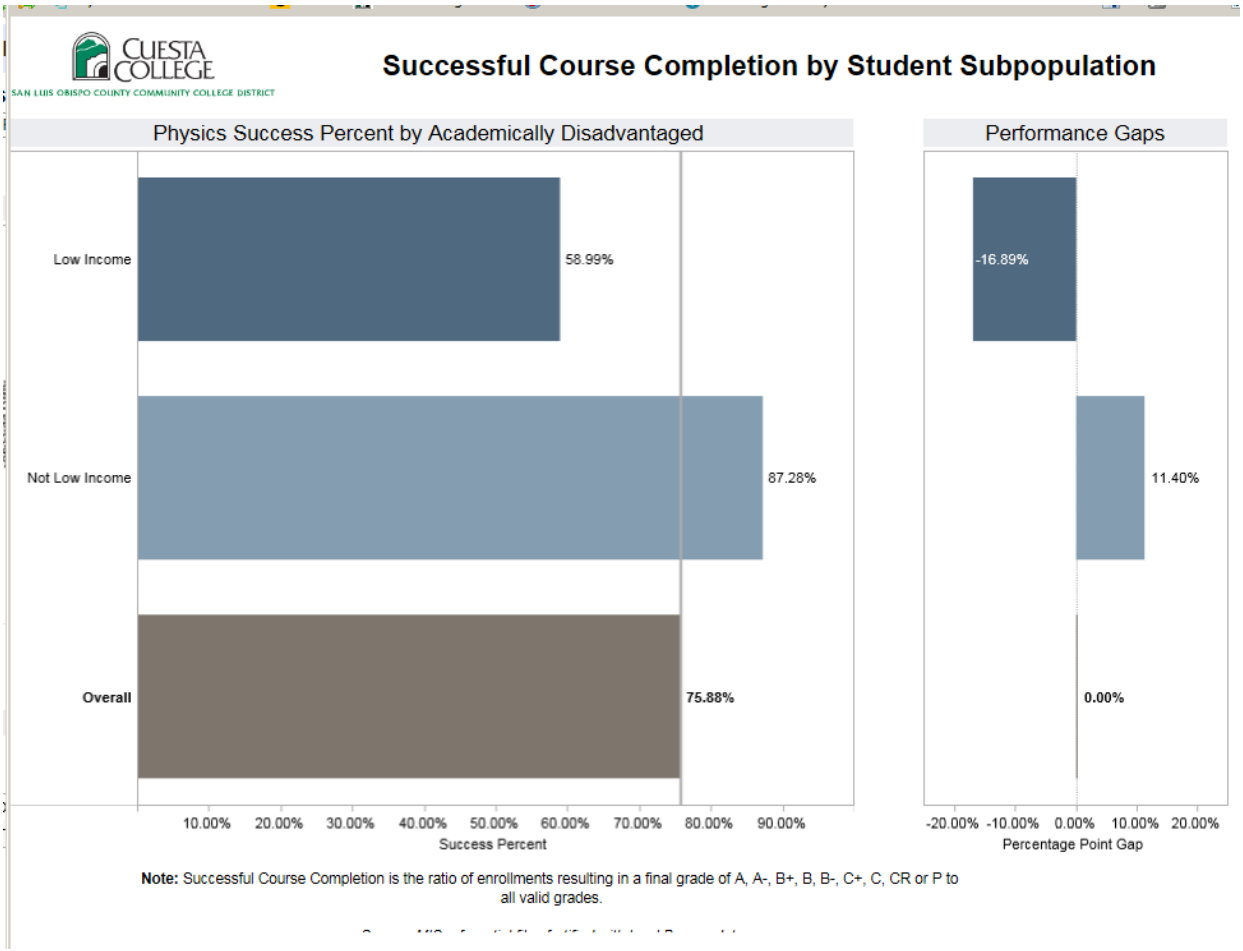


Physics Success Rate Table

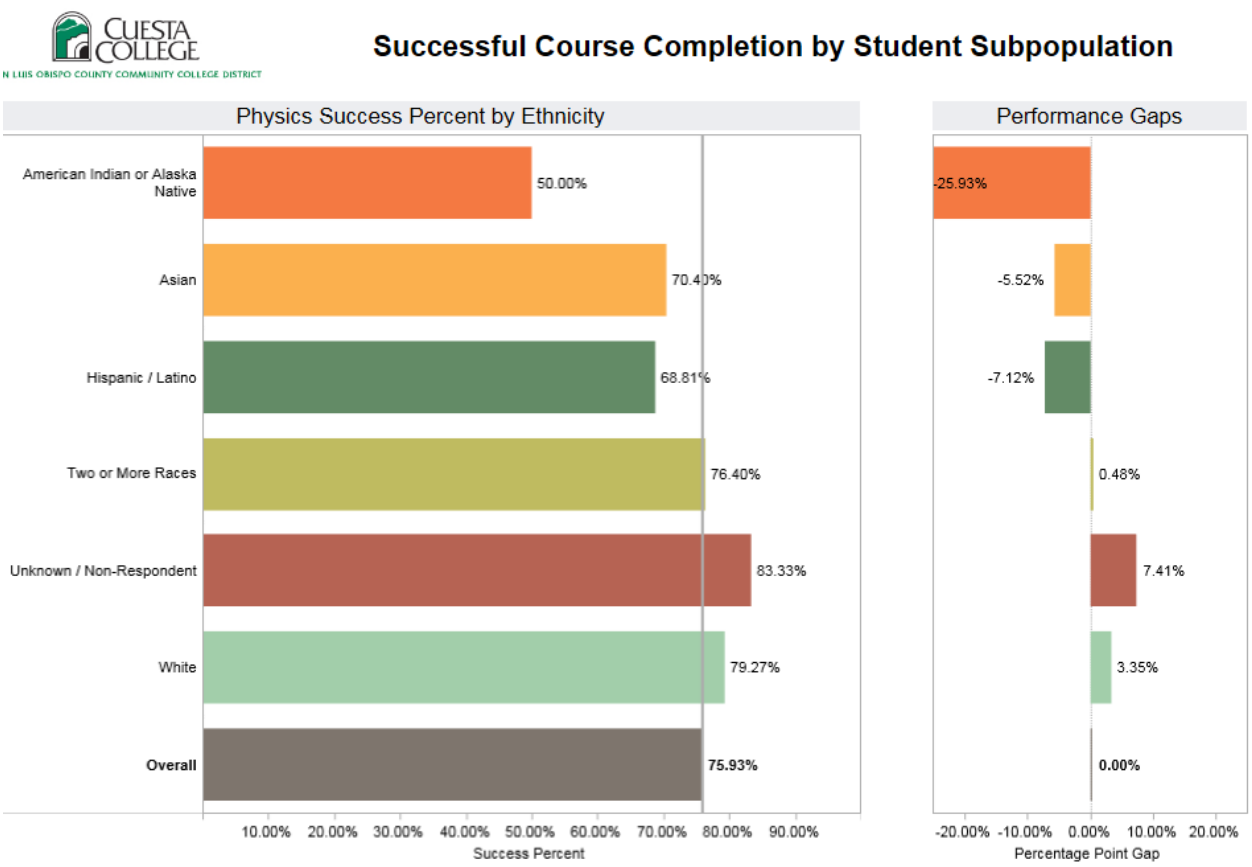
	Academic Year 2013 - 2014	Academic Year 2014 - 2015	Academic Year 2015 - 2016	Academic Year 2016 - 2017	Academic Year 2017 - 2018
Department Success..	74.48%	75.81%	73.82%	76.18%	78.94%
Total Enrollments	533	620	592	550	603

Although the success rate is slightly lower than the Distric average, there is gradual improvement during the five year reporting period. As previously stated, the success rate of the Dual enrollment PHYS 205A sections at Templeton High School may be one factor contributing to the recent increase.

Review the Disaggregated Student Success charts; include any charts that you will reference. Describe any departmental or pedagogical outcomes that have occurred as a result of programmatic discussion regarding the data presented.



Looking at the disaggregated data, there are significant performance gaps in physics students who are academically disadvantaged, although this is also true college-wide.



Note: Successful Course Completion is the ratio of enrollments resulting in a final grade of A, A-, B+, B, B-, C+, C, CR or P to all valid grades.

Looking at the disaggregated data for ethnicity, Native American, Asian, and Latinx students had performance gaps although the sample size for the Native American students is rather small. Anectotally, Latinx students have inquired about MESA and MeCHA resources on campus. There seems to be a need for additional resources for this subpopulation.

XX. CURRICULUM REVIEW

E. List all courses and degrees/certificates that have been created, modified, or deactivated (and approved by the Curriculum Committee) since the last CPPR. Complete the Curriculum Review Template and submit the form within your CPPR.

PHYS 205A
PHYS 205B
PHYS 208A
PHYS 208B
PHYS 208C
PHYS 208AX
PHYS 208BX

F. Completing the template will provide evidence that the curriculum (including course delivery modalities) has been carefully reviewed during the past five years for currency in teaching practices, compliance with current policies, standards, regulations, and with

advisory committee input. The form requires you to include evidence that the following entries on the course outline of record (CurricUNET format) are appropriate and complete:

- Course description
- Student learning outcomes
- Caps
- New DE addendum is complete
- MQDD is complete
- Pre-requisites/co-requisites
- Topics and scope
- Course objectives
- Alignment of topics and scopes, methods of evaluation, and assignments with objectives
- Alignment of SLOs and objectives with approved requirement rubrics (General Education, Diversity, Health, Liberal Arts)
- Textbooks
- CSU/IGETC transfer and AA GE information
- Degree and Certificate information

The template also includes a calendar of a five-year cycle during which all aspects of the course outline of record and program curriculum, including the list above, will be reviewed for currency, quality, and appropriate CurricUNET format.

PHYS Course Assessment Calendar

CYCLE STAGE	Fall 2018	Sp 2019	Fall 2019	Sp 2020	Fall 2020	Sp 2021	Fall 2021	Sp 2022	Fall 2022
SLO Assessment	PHYS 205A PHYS 208AX PHYS 208BX PHYS 208A PHYS 208B	PHYS 205B PHYS 208C			PHYS 205A PHYS 208AX PHYS 208BX PHYS 208A PHYS 208B	PHYS 205B PHYS 208C			PHYS 205A PHYS 208AX PHYS 208BX PHYS 208A PHYS 208B
Analyze Results & Plan Improvements		PHYS 205A PHYS 208AX PHYS 208BX PHYS 208A PHYS 208B	PHYS 205B PHYS 208C			PHYS 205A PHYS 208AX PHYS 208BX PHYS 208A PHYS 208B	PHYS 205B PHYS 208C		
Plan Implementation		PHYS 205A	PHYS 205A PHYS 208AX PHYS 208BX PHYS 208A PHYS 208B	PHYS 205B PHYS 208C			PHYS 205A PHYS 208AX PHYS 208BX PHYS 208A PHYS 208B	PHYS 205B PHYS 208C	

PHYS Program Assessment Calendar

CYCLE STAGE	Fall 2018	Sp 2019	Fall 2019	Sp 2020	Fall 2020	Sp 2021	Fall 2021	Sp 2022	Fall 2022
SLO Assessment	PLO 1 PLO 2	PLO 2 PLO 3	PLO 4 PLO 5		PLO 1 PLO 2	PLO 2 PLO 3	PLO 4 PLO 5		PLO 1 PLO 2
Analyze Results & Plan Improvements		PLO 1 PLO 2	PLO 2 PLO 3	PLO 4 PLO 5		PLO 1 PLO 2	PLO 2 PLO 3	PLO 4 PLO 5	
Plan Implementation			PLO 1 PLO 2	PLO 2 PLO 3	PLO 4 PLO 5		PLO 1 PLO 2	PLO 2 PLO 3	PLO 4 PLO 5
Post-Implementation SLO Assessment				PLO 1 PLO 2	PLO 2 PLO 3	PLO 4 PLO 5		PLO 1 PLO 2	PLO 2 PLO 3

XXI. PROGRAM OUTCOMES, ASSESSMENT AND IMPROVEMENTS

L. Attach or insert the assessment calendar for your program for the next program review cycle.

See previous pages.

M. Have you completed all course assessments in eLumen? If no, explain why you were unable to do so during this program review cycle and what plan(s) exist for completing this in the next program review cycle.

Yes.

N. Include the most recent "PLO Summary Map by Course" from eLumen which shows the Course-level SLOs mapped to the Program-level SLOs.

See attached.

O. Highlight changes made at the course or program level that have resulted from SLO assessment.

In PHYS 208C, we changed textbooks to give the student a more complete coverage of the modern physics topics, and to enable the students to use Mastering Physics as an additional tool to provide practice in problem solving and in understanding the difficult, abstract concepts of modten physics.

P. Identify and describe any budget or funding requests that are related to student learning outcome assessment results. If applicable, be sure to include requests in the Resource Plan Worksheet.

In the Physics 208C lab, we often have to run two different labs during the same lab period due to a lack of individual setups for each lab. This is not optimum, because there are often different lighting requirements, and also the overall lab focus on each subject is not as coherent. As our enrollment in Physics 208C grows, we will need to increase the number of working lab stations.

XXII. PROGRAM DEVELOPMENT

Indicate how the program supports efforts to achieve any of the following:

G. Institutional Goals and Objectives

Institutional Goal 1 and Objectives 1.1 and 1.2 focus on increasing student success and creating a positive college environment. The Physics program strongly supports these Institutional objectives. The Physics Department has actively pursued increasing student success with a variety of support mechanisms such as the PHYS 208AX and PHYS 208BX problem-solving courses.

Institutional Goal 2 focuses on student access to higher education. The Physics Department has made an effort to improve access by offering distance education courses in the non-calculus based sequence (PHYS 205A and PHYS 205B) at a local high school.

H. Institutional Learning Outcomes

Students who complete PHYS 205A, PHYS 205B, PHYS 208A, PHYS 208B, PHYS 208C, PHYS 208AX, and PHYS 208BX will meet the following ILOs:

ILO 2 Critical Thinking and Communication

Students in all physics courses improve their critical thinking skills by analyzing complex physics problems in both lecture and laboratory settings. In the laboratory in particular, students are required to develop experimental plans to verify physical information. Students improve their communication skills by answering questions in both sentence and equation formats. In PHYS 208C, students practice scientific communication by keeping a laboratory notebook and developing and writing lab reports.

ILO 3 Scientific and Environmental Understanding

All courses in the physics program help students improve scientific understanding. The lab component of physics courses is essential for the outcome of drawing conclusions based on the scientific method, computations or experimental and observational evidence.

ILO 6 Technical and Information Fluency

Many of the laboratory experiments in PHYS 205A, PHYS 205B, PHYS 208A, PHYS 208B, and PHYS 208C require students to measure data using computer controlled instrumentation. Students also manipulate and graph data using excel. Most homework is completed through an online homework system, Mastering Physics.

I. Program outcomes

Indicate any anticipated changes in the following areas:

I. Curriculum and scheduling

There is increased demand for additional PHYS 205A and PHYS 205B sections at local area high schools. This will require creative scheduling and additional full-time faculty to meet the demand if the District chooses to offer the sections. Scheduling the calculus-based physics courses continues to be a challenge due to the number of high

unit courses that STEM students require. Calculus-based physics requires scheduling around math, biology, chemistry, and engineering schedules with multiple course conflicts in many divisions.

Enrollment in all courses will continued to be monitored to determine if they number of sections is adequate to meet student demand. Currently, some sections of PHYS 208A and PHYS 208B are being offered as "triples" (with three lab sections combined to one lecture). This is not ideal for student learning, but is required due to our currently low number of faculty teaching physics. We have unsuccessfully tried to hire additional adjunct faculty, but often these searches yield no qualified applicants.

J. Support services to promote success, persistence and retention
The physical sciences and biology divisions are hoping to create a student space in the 2300 faculty office building, where students can congregate to promote student interaction.

Faculty will continue to learn about equity issues and strive to decrease the equity gap by attending equity workshops.

We will also work toward projects that build community and informal student cohorts among STEM students.

K. Facilities needs
The department is looking forward to improvements in the 2300 and 2400 buildings from Measure L funds. The roofs of the 2100 and 2400 buildings need to be fixed to prevent them from leaking. Room 2401, which is primarily a biology classroom, but is often used for physics classes, needs significant upgrades to student work spaces. We are looking forward to the installation of white boards in the hallways of the 2300 faculty office building to facilitate student cooperative work outside of class.

The classrooms in the new 2600 building are not ideal for learning physics. The chemistry department will continue to work with Facilities to improve the learning space through efforts such as installing risers so that teachers can reach the top of the white boards, sound dampening devices to reduce echo, improvements in the audio-visual equipment in the rooms, and ways to improve the rooms so students can see the instructor and the content on the white boards.

L. Staffing needs/projections
At the moment, staffing is low in physics faculty. Hiring part-time faculty may help in the short term if qualified physicists apply.

If dual enrollment courses are offered in the high schools with Cuesta faculty delivering content online, then more full time physics faculty will need to be hired.

Lastly, address any changes in strategy in response to the predicted budget and FTES target for the next program review cycle.

We have communicated with the administration some strategies to increase the number of FTES served and maximize revenue generated using the new funding formula. These include offering sections at local area high schools. We have not received the required support to expand this program beyond the current level of offerings.

XXIII. END NOTES

If applicable, you may attach additional documents or information, such as awards, grants, letters, samples, lists of students working in the field, etc.

XXIV. After completing and submitting this document, please complete the Overall Program Strength and Ongoing Viability Assessment with your Dean before May 15, 2018.

SIGNATURE PAGE

Faculty, Director(s), Manager(s), and/or Staff Associated with the Program

Instructional Programs: All full-time faculty in the program must sign this form. If needed, provide an extra signature line for each additional full-time faculty member in the program. If there is no full-time faculty associated with the program, then the part-time faculty in the program should sign. If applicable, please indicate lead faculty member for program after printing his/her name.

Student Services and Administrative Services Programs: All full-time director(s), managers, faculty and/or classified staff in the program must sign this form. (More signature lines may be added as needed.)

Division Chair/Director Name	Signature	Date
Name	Signature	Date
Name	Signature	Date
Name	Signature	Date
Name	Signature	Date
Name	Signature	Date
Name	Signature	Date

SUPPLEMENTAL DOCUMENTS

FACULTY HIRING PRIORITIZATION INFORMATION (IF APPLICABLE)

If your program requested a faculty position for consideration, please attach or embed the following worksheets that were presented to the College Council. The guidelines for faculty prioritization can be found here: https://cuestacollege.sharepoint.com/Committees/IPPR/Committee%20Documents?viewpath=%2FCommittees%2FIPPR%2FCommittee%20Documents&id=%2FCommittees%2FIPPR%2FCommittee%20Documents%2FPrioritization%20Process%20Handbook%20Sept%5F25%5F2018%2Epdf&parent=%2FCommittees%2FIPPR%2FCommittee%20Documents

APPLICABLE SIGNATURES:

Vice President/Dean	**Date**
Division Chair/Director/Designee	**Date**
Other (when applicable)	**Date**

The above-signed individuals have read and discussed this review. The Director/Coordinator, Faculty, and staff in the program involved in the preparation of the CPPR acknowledge the receipt of a copy of the Vice President/ Dean's narrative analysis. The signatures do not necessarily signify agreement.

CURRICULUM REVIEW GUIDE and WORKSHEET
Courses and Programs

Current Review Date ____2/24/2019_____

Reviewer _Bret Clark_____

6. Courses

- List all courses, which were active in your program at the time of the last CPPR.
- Review the current CurricUNET Course Outline of Record (COR) for each course and indicate yes/no for each column below.
- For each new, modified, and deactivated course provide the effective term posted on CurricUNET.

Course (Prefix / Number)	Currently active	New course since last CPPR	Major modification since last CPPR	Minor modification since last CPPR	Deactivated since last CPPR Notified impacted program(s)*
PHYS 205A	yes / no	no / yes: date	no / yes: date	no / yes: date	no / yes: date
PHYS 205B	yes / no	no / yes: date	no / yes: date	no / yes: date	no / yes: date
PHYS 208A	yes / no	no / yes: date	no / yes: date	no / yes: date	no / yes: date
PHYS 208B	yes / no	no / yes: date	no / yes: date	no / yes: date	no / yes: date
PHYS 208C	yes / no	no / yes: date	no / yes: date	no / yes: date	no / yes: date
PHYS 208AX	yes / no	no / yes: date 3/1/16	no / yes: date	no / yes: date	no / yes: date
PHYS 208BX	yes / no	no / yes: date 8/1/16	no / yes: date	no / yes: date	no / yes: date
PHYS 218	yes / no	no / yes: date	no / yes: date	no / yes: date	no / yes: date

*Note: Please state if the deactivated course impacted any other program(s) and if and when the affected program(s) was/were notified:

Deactivated Course	Impacted Program (s)	Date affected program was notified

7. Course Review

- Please review the current CurricUNET CORs for all active courses in your program for currency and accuracy and annotate the items below.
- If you find any mistakes in the CORs (e.g. non-content related items such as typos), contact the Curriculum Chair or Curriculum Specialist for correction.
- All other changes require either a minor or major modification. Your curriculum representative will assist you.
- Some modifications need to be processed in the current term (see annotations # 2 and #3 below).
- Some modifications can be done over the period of the next five years (see annotation #1 below).
- Indicate on the Five-Year Cycle Calendar below when a minor or major modification will be submitted.

Course Number	208A	208AX	208B	208BX
17. Effective term listed on COR	Date: S2015	Date: S2016	Date: S2015	Date: F2016
18. Catalog / schedule description is appropriate	yes / no[1]	yes / no[1]	yes / no[1]	yes / no[1]
19. Pre-/ co-requisites / advisories (if applicable) are appropriate	yes / no[2]	yes / no[2]	yes / no[2]	yes / no[2]
20. "Approved as Distance Education" is accurate (and new addendum complete)	yes / no[4]	yes / no[4]	yes / no[4]	yes / no[4]
21. Grading Method is accurate	yes / no[1]	yes / no[1]	yes / no[1]	yes / no[1]
22. Repeatability is zero	yes / no[4]	yes / no[4]	yes / no[4]	yes / no[4]
23. Class Size is accurate	yes / no[2]	yes / no[2]	yes / no[2]	yes / no[2]
24. Objectives are aligned with methods of evaluation	yes / no[1]	yes / no[1]	yes / no[1]	yes / no[1]
25. Topics / scope are aligned with objectives	yes / no[1]	yes / no[1]	yes / no[1]	yes / no[1]
26. Assignments are aligned with objectives	yes / no[1]	yes / no[1]	yes / no[1]	yes / no[1]
27. Methods of evaluation are appropriate	yes / no[1]	yes / no[1]	yes / no[1]	yes / no[1]
28. Texts, readings, materials are dated within last 5 years	yes / no[3] 2013	yes / no[1] 2014	yes / no[3] 2013	yes / no[3] 2014
29. CSU / IGETC transfer & AA GE information (if applicable) is correct	yes / no[4]	yes / no[4]	yes / no[4]	yes / no[4]
30. Degree / Certificate information (if applicable) is correct	yes / no[4]	yes / no[4]	yes / no[4]	yes / no[4]
31. Course Student Learning Outcomes are accurate	yes / no[4]	yes / no[4]	yes / no[4]	yes / no[4]
32. Library materials are adequate and current *	yes / no[1]	yes / no[1]	yes / no[1]	yes / no[1]

Course Number	205A	205B	218	
17. Effective term listed on COR	Date: F2017	Date: F2017	Date: S2010	
18. Catalog / schedule description is appropriate	yes / no[1]	yes / no[1]	yes / no[1]	
19. Pre-/ co-requisites / advisories (if applicable) are appropriate	yes / no[2]	yes / no[2]	yes / no[2]	
20. "Approved as Distance Education" is accurate (and new addendum complete)	yes / no[4]	yes / no[4]	yes / no[4]	
21. Grading Method is accurate	yes / no[1]	yes / no[1]	yes / no[1]	
22. Repeatability is zero	yes / no[4]	yes / no[4]	yes / no[4]	
23. Class Size is accurate	yes / no[2]	yes / no[2]	yes / no[2]	
24. Objectives are aligned with methods of evaluation	yes / no[1]	yes / no[1]	yes / no[1]	
25. Topics / scope are aligned with objectives	yes / no[1]	yes / no[1]	yes / no[1]	
26. Assignments are aligned with objectives	yes / no[1]	yes / no[1]	yes / no[1]	
27. Methods of evaluation are appropriate	yes / no[1]	yes / no[1]	yes / no[1]	
28. Texts, readings, materials are dated within last 5 years	yes / no[3] 2009	yes / no[3] 2009	yes / no[1]	
29. CSU / IGETC transfer & AA GE information (if applicable) is correct	yes / no[4]	yes / no[4]	yes / no[4]	
30. Degree / Certificate information (if applicable) is correct	yes / no[4]	yes / no[4]	yes / no[4]	
31. Course Student Learning Outcomes are accurate	yes / no[4]	yes / no[4]	yes / no[4]	
32. Library materials are adequate and current *	yes / no[1]	yes / no[1]	yes / no[1]	

[1] If no, a major modification is needed within the next 5 years (see five-year cycle calendar).
[2] If no, a major modification is needed in the current term. (For increase in class size, see your curriculum representative for details.)
[3] If no, a minor modification is needed in the current term.
[4] If no, contact the Curriculum Chair or Curriculum Specialist.

8. Programs

- List all programs/certificates that were active at the time of the last CPPR.
- Review the CurricUNET "Program of Study" outline and indicate yes/no for each program/certificate.
- For each deactivated program provide the effective term posted on CurricUNET.

Program / Certificate Title	Currently active	New program since last CPPR	Program modification since last CPPR	Deactivated since last CPPR
Physics AS	yes / no	no / yes: date	no / yes: date	no / yes: date
Physics AS-T	yes / no	no / yes: date	no / yes: date	no / yes: date
	yes / no	no / yes: date	no / yes: date	no / yes: date
	yes / no	no / yes: date	no / yes: date	no / yes: date
	yes / no	no / yes: date	no / yes: date	no / yes: date
	yes / no	no / yes: date	no / yes: date	no / yes: date

9. Program Review

- Review the CurricUNET "Program of Study" outline for each active program/certificate and indicate yes/no for each column below.

Currently active Program / Certificate: Title	Required courses and electives, incl. course numbers, course titles, and course credits, are accurate	Program description is current	Program Learning Outcomes are accurate and include method of assessment
Physics AS	yes / no*	yes / no*	yes / no*
Physics AD-T	yes / no*	yes / no*	yes / no*
	yes / no*	yes / no*	yes / no**
	yes / no*	yes / no*	yes / no**
	yes / no*	yes / no*	yes / no**
	yes / no*	yes / no*	yes / no**

* If not, program modification is needed.

** If not, Program Learning Outcomes modification is needed.

10. Five-Year Cycle Calendar

- During the following five-year cycle all aspects of the course outline of record and program curriculum will be reviewed for currency, quality, and appropriate CurricUNET format.
- Indicate if a course needs a major or minor modification based on the current course review. Your curriculum representative will assist you.
- When submitting a major or minor modification, please enter or update the Student Learning Outcomes for each course.

COURSES

Course Number	Spring 2019	Fall 2019	Spring 2020	Fall 2020	Spring 2021	Fall 2021	Spring 2022	Fall 2022	Spring 2023
PHYS 205A	major / minor	major / minor	major / minor	major / minor	major / minor	major / minor	major / minor	major / minor	major / minor
PHYS 205B	major / minor	major / minor	major / minor	major / minor	major / minor	major / minor	major / minor	major / minor	major / minor
PHYS 208A	major / minor	major / minor	major / minor	major / minor	major / minor	major / minor	major / minor	major / minor	major / minor
PHYS 208B	major / minor	major / minor	major / minor	major / minor	major / minor	major / minor	major / minor	major / minor	major / minor
PHYS 208C	major / minor	major / minor	major / minor	major / minor	major / minor	major / minor	major / minor	major / minor	major / minor
PHYS 208AX	major / minor	major / minor	major / minor	major / minor	major / minor	major / minor	major / minor	major / minor	major / minor
PHYS 208BX	major / minor	major / minor	major / minor	major / minor	major / minor	major / minor	major / minor	major / minor	major / minor
PHYS 218	major / minor	major / minor	major / minor	major / minor	major / minor	major / minor	major / minor	major / minor	major / minor
	major / minor	major / minor	major / minor	major / minor	major / minor	major / minor	major / minor	major / minor	major / minor
	major / minor	major / minor	major / minor	major / minor	major / minor	major / minor	major / minor	major / minor	major / minor
	major / minor	major / minor	major / minor	major / minor	major / minor	major / minor	major / minor	major / minor	major / minor
	major / minor	major / minor	major / minor	major / minor	major / minor	major / minor	major / minor	major / minor	major / minor

PROGRAMS / CERTIFICATES

Program/Certificate Title	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring
Physics AS		modify	modify	modify	modify	modify	modify	modify	modify	modify
Physics AD-T		modify	modify	modify	modify	modify	modify	modify	modify	modify
		modify	modify	modify	modify	modify	modify	modify	modify	modify
		modify	modify	modify	modify	modify	modify	modify	modify	modify

ILO/PLO Summary Map by Course/Context

Map Origin: Courses for Physics
Map Target: AST_PHYSICS

AST_PHYSICS SLOs	AST_PHYSICS				
	Analyze systems where quantum effects and relativity are appropriate	Apply conservation of momentum and the relationship between impulse and momentum in order to solve problems involving: a) general collisions b) forces applied over time c) perfectly elastic and inelastic collisions	Apply statics and dynamics principles in order to solve problems involving: a) motion of masses b) electric forces c) gravitational forces d) magnetic forces	Safely perform laboratory experiments based on qualitative and quantitative analyses utilizing various apparati and measuring devices.	Utilize the concept of conservation of energy in problems involving: a) motion of masses b) electric fields and potentials c) magnetic fields d) gravitational fields
PHYS193C					
Describe the principles relating experiment and theory in nuclear physics.					
Recognize the magnitude and scope of the CERN project, which has recently made a great discovery: the experimental verification of the existence of the Higgs Boson.					
PHYS193E					
Apply concepts discussed in PHYS208B lecture to solve advanced PHYS 208B problems					
Analyze information given in written form, parsing out important information to derive a solution map for problems					
Improve studying skills through better time-management, effective text reading, and setting appropriate goals.					
PHYS205A					

AST_PHYSICS SLOs	AST_PHYSICS				
	Analyze systems where quantum effects and relativity are appropriate	Apply conservation of momentum and the relationship between impulse and momentum in order to solve problems involving: a) general collisions b) forces applied over time c) perfectly elastic and inelastic collisions	Apply statics and dynamics principles in order to solve problems involving: a) motion of masses b) electric forces c) gravitational forces d) magnetic forces	Safely perform laboratory experiments based on qualitative and quantitative analyses utilizing various apparati and measuring devices.	Utilize the concept of conservation of energy in problems involving: a) motion of masses b) electric fields and potentials c) magnetic fields d) gravitational fields
Describe and quantify motion (kinematics), and apply Newton's laws to describe how forces affect motion (mechanics). (E.g. analyze forces acting on an object with a free-body diagram, and determine subsequent motion given initial conditions.)					
Describe and apply conservation laws of energy, linear momentum, and angular momentum to quantify the initial-to-final evolution of systems of objects. (E.g. determine final state of a system of objects given initial conditions and in-process exchanges, by deciding which relevant objects to include in a system in order to implement appropriate conservation law(s).)					
Describe and quantify different types of oscillations and waves, and the physical principles of these phenomena. (E.g. explain/predict the experience of disturbances of differnt media.)					

AST_PHYSICS SLOs	AST_PHYSICS				
	Analyze systems where quantum effects and relativity are appropriate	Apply conservation of momentum and the relationship between impulse and momentum in order to solve problems involving: a) general collisions b) forces applied over time c) perfectly elastic and inelastic collisions	Apply statics and dynamics principles in order to solve problems involving: a) motion of masses b) electric forces c) gravitational forces d) magnetic forces	Safely perform laboratory experiments based on qualitative and quantitative analyses utilizing various apparati and measuring devices.	Utilize the concept of conservation of energy in problems involving: a) motion of masses b) electric fields and potentials c) magnetic fields d) gravitational fields
Describe and apply the laws of thermodynamics to quantify the initial-to-final evolution of microscopic and macroscopic systems of gases, fluids, and solids. (E.g. determine the final state of a gas/fluid/solid, given initial conditions and in-process exchanges, by implement appropriate conservation law(s).)					
PHYS205B					
Describe and quantify geometric and physical behavior of light. (E.g., model image formation by lenses, or interference/diffraction by slits.)					
Describe and quantify behavior of electric forces, fields, potential energy, and potentials. (E.g., given certain materials, or configuration of point charges, apply superposition to find net result at a certain location.)					
Describe and apply conservation laws of current and potentials to circuits. (E.g., given circuit with ideal/non-ideal emfs, resistors, capacitors, switches, determine currents and potential differences.)					

AST_PHYSICS SLOs	AST_PHYSICS				
	Analyze systems where quantum effects and relativity are appropriate	Apply conservation of momentum and the relationship between impulse and momentum in order to solve problems involving: a) general collisions b) forces applied over time c) perfectly elastic and inelastic collisions	Apply statics and dynamics principles in order to solve problems involving: a) motion of masses b) electric forces c) gravitational forces d) magnetic forces	Safely perform laboratory experiments based on qualitative and quantitative analyses utilizing various apparati and measuring devices.	Utilize the concept of conservation of energy in problems involving: a) motion of masses b) electric fields and potentials c) magnetic fields d) gravitational fields
Describe and quantify behavior of magnetic forces, fields, fluxes, and induction. (E.g., given configuration of current-carrying wires/loops, determine resulting forces, induced emfs, or induced currents on other objects, or in time-varying circuits.)					
Describe and quantify phenomena in modern (post 19th century) physics such as relativity, atomic physics, nuclear physics, etc. (E.g., describe why certain systems demand non-classical models, and be able to quantify behaviors of these systems.)					
PHYS208A					
Apply work-energy equations when appropriate to solve problems in mechanics					X
Perform laboratory experiments effectively utilizing appropriate experimental apparatuses				X	
Solve static and dynamic systems by utilizing Newton's Laws of Motion			X		
Utilize impulse and momentum concepts to solve problems		X			
PHYS208AX					

AST_PHYSICS SLOs	AST_PHYSICS				
	Analyze systems where quantum effects and relativity are appropriate	Apply conservation of momentum and the relationship between impulse and momentum in order to solve problems involving: a) general collisions b) forces applied over time c) perfectly elastic and inelastic collisions	Apply statics and dynamics principles in order to solve problems involving: a) motion of masses b) electric forces c) gravitational forces d) magnetic forces	Safely perform laboratory experiments based on qualitative and quantitative analyses utilizing various apparati and measuring devices.	Utilize the concept of conservation of energy in problems involving: a) motion of masses b) electric fields and potentials c) magnetic fields d) gravitational fields
Identify and categorize the problem types when the given information is in written form.					
Analyze information given in written form, parsing out important information to derive a solution map for problems.					
Use appropriate methods to solve kinematics, force, torque, energy, impulse-momentum, thermodynamics, fluid mechanics, and simple harmonic motion problems.					
PHYS208B					
Analyze and compute electric and magnetic forces, fields, and energy		X	X		X
Describe the mechanics of wave motion by utilizing Newton's Laws of Motion		X	X		X
Model optical systems					X
Perform laboratory experiments effectively utilizing appropriate experimental apparatuses				X	
PHYS208BX					
Analyze information given in written form, parsing out important information to derive a solution map for problems					
Identify problem types given information in written form					

AST_PHYSICS SLOs	AST_PHYSICS				
	Analyze systems where quantum effects and relativity are appropriate	Apply conservation of momentum and the relationship between impulse and momentum in order to solve problems involving: a) general collisions b) forces applied over time c) perfectly elastic and inelastic collisions	Apply statics and dynamics principles in order to solve problems involving: a) motion of masses b) electric forces c) gravitational forces d) magnetic forces	Safely perform laboratory experiments based on qualitative and quantitative analyses utilizing various apparati and measuring devices.	Utilize the concept of conservation of energy in problems involving: a) motion of masses b) electric fields and potentials c) magnetic fields d) gravitational fields
Use appropriate methods to solve problems that include: wave phenomena, systems of static and moving charge, systems involving magnetic fields					
PHYS208C					
Calculate time dilation, length contraction and mass increases using special relativity results.	X				
Demonstrate understanding of the concept of energy and it relationship to special relativity.					
Describe how general relativity results relate to gravitational effects near exotic objects.					
Demonstrate understanding of how the experimental data verify that waves have particle-like properties.					
Demonstrate understanding of how the experimental data verify that particles have wave-like properties.					
Relate the principles of quantum theory to atomic structure.					
Summarize the solutions to the Schroedinger Equation for the hydrogen atom.					

AST_PHYSICS SLOs	AST_PHYSICS				
	Analyze systems where quantum effects and relativity are appropriate	Apply conservation of momentum and the relationship between impulse and momentum in order to solve problems involving: a) general collisions b) forces applied over time c) perfectly elastic and inelastic collisions	Apply statics and dynamics principles in order to solve problems involving: a) motion of masses b) electric forces c) gravitational forces d) magnetic forces	Safely perform laboratory experiments based on qualitative and quantitative analyses utilizing various apparati and measuring devices.	Utilize the concept of conservation of energy in problems involving: a) motion of masses b) electric fields and potentials c) magnetic fields d) gravitational fields
Outline the solutions to the Schroedinger Equation as they relate to many electron atoms.					
Use the uncertainty principle to calculate the range of the strong nuclear force.					
Calculate the energy released in nuclear reactions.					
Outline the properties of dub-atomic particles.					
Solve problems involving the half-life of a substance.					
Summarize the strengths and ranges of the known forces of nature.					
PHYS218					
Apply concepts discussed in PHYS208 lecture to an array of new problems.					
Analyze information given in written form, parsing out important information to derive a solution map for problems					

2019 INSTRUCTIONAL ANNUAL PROGRAM PLANNING WORKSHEET

CURRENT YEAR: 2018 - 2019 **PROGRAM: EOS**
CLUSTER: WORKFORCE & ECONOMIC DEVELOPMENT **LAST YEAR CPPR COMPLETED: MARCH 2016**
NEXT SCHEDULED CPPR: 2020-21 **CURRENT DATE: 2/1/2019**

The Annual Program Planning Worksheet (APPW) is the process for:

- reviewing, analyzing and assessing programs on an annual basis
- documenting relevant program changes, trends, and plans for the upcoming year
- identifying program needs, if any, that will become part of the program's resource plan
- highlighting specific program accomplishments and updates since last year's APPW
- tracking progress on a Program Sustainability Plan if established previously.

Note: Degrees and/or certificates for the same program may be consolidated into one APPW.

This APPW encompasses the following degrees and/or certificates:
Geology AS degree, ADT in geology, and pending Certificate of Achievement in GIS (Geographic Information Systems),

GENERAL PROGRAM UPDATE

Describe significant changes, if any, to program mission, purpose or direction. *If there are not any, indicate: NONE.*

We are offering Geology 212 now as Environmental Geology. Two new courses ENVS 200 Introduction to Environmental Sciences and GEOL 225 Introduction to GIS have been added to our suite of offerings for 2019. ENVS 200 is part of the AD-T in Environment Science. GIS will offer a certificate beginning in Fall 2019. All EOS courses are offered either as Distance Education or on the SLO campus. We no longer offer EOS courses on the North County campus because of low enrollments.

PROGRAM SUSTAINABILITY PLAN UPDATE

Was a Program Sustainability Plan established in your program's most recent Comprehensive Program Plan and Review?

Yes ☐ If yes, please complete the Program Sustainability Plan Progress Report below.
No ☒ If no, you do not need to complete a Progress Report.

If you selected yes, please complete the Program Sustainability Plan Progress Report below after you complete the Data Analysis section. That data collection and analysis will help you to update, if necessary, your Program Sustainability Plan.

DATA ANALYSIS AND PROGRAM-SPECIFIC MEASUREMENTS

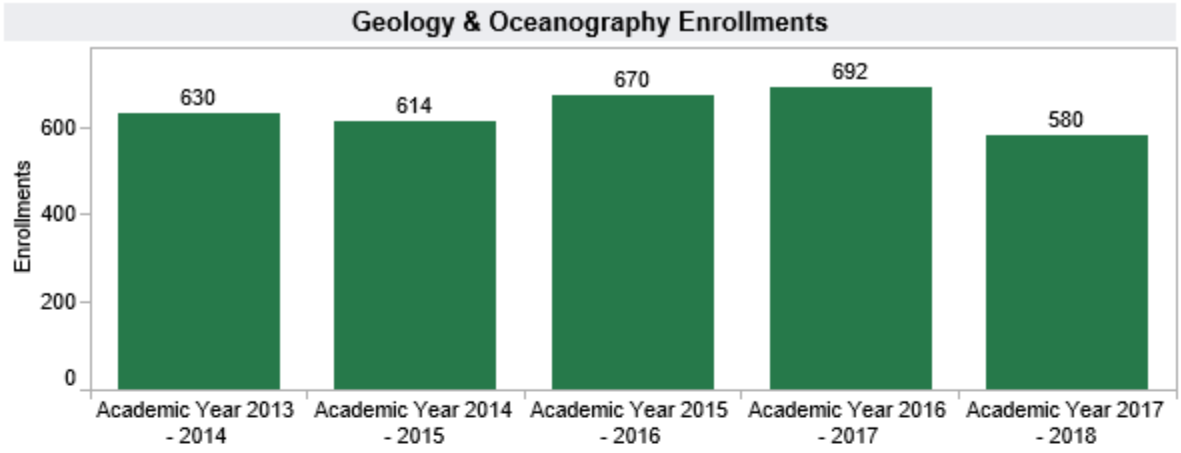
Your responses to the prompts for the data elements below should be for the entire program. If this APPW is for multiple degrees and/or certificates then you MAY want to comment on each degree and/or certificate, or discuss them holistically for the entire program being sure to

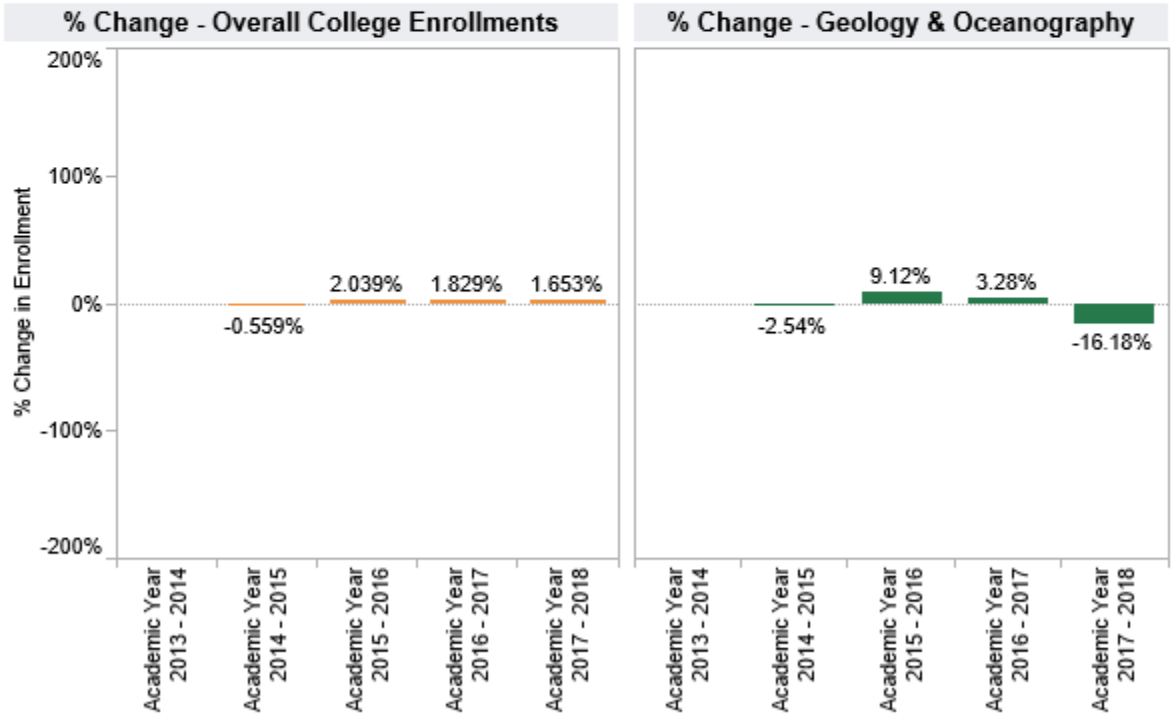
highlight relevant trends for particular degrees and/or certificates, if necessary. Responses in this document need only reference the most recent year's available data.

General Enrollment (Insert Aggregated Data Chart)

Insert the data chart and explain observed differences between the program and the college.

Geology and Oceanography





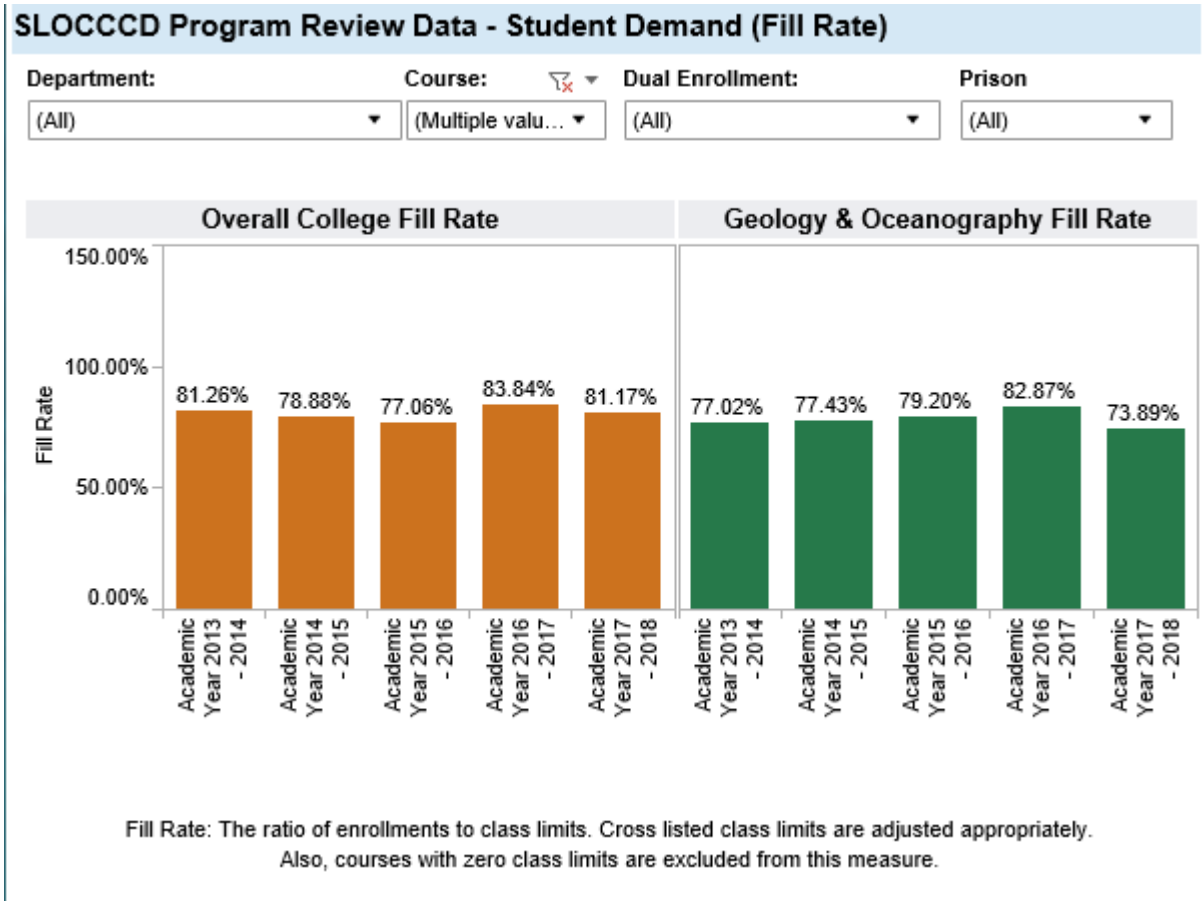
Enrollment: Duplicated count of students who completed greater than 0 units in positive attendance courses or were present on census for all other accounting methods.

Our enrollments were stable for many years and then declined slightly in 2017-18 when we stopped offering classes on the North County campus.

2019 INSTRUCTIONAL ANNUAL PROGRAM PLANNING WORKSHEET

General Student Demand (Fill Rate) (Insert Aggregated Data Chart)

Insert the data chart and explain observed differences between the program and the college.

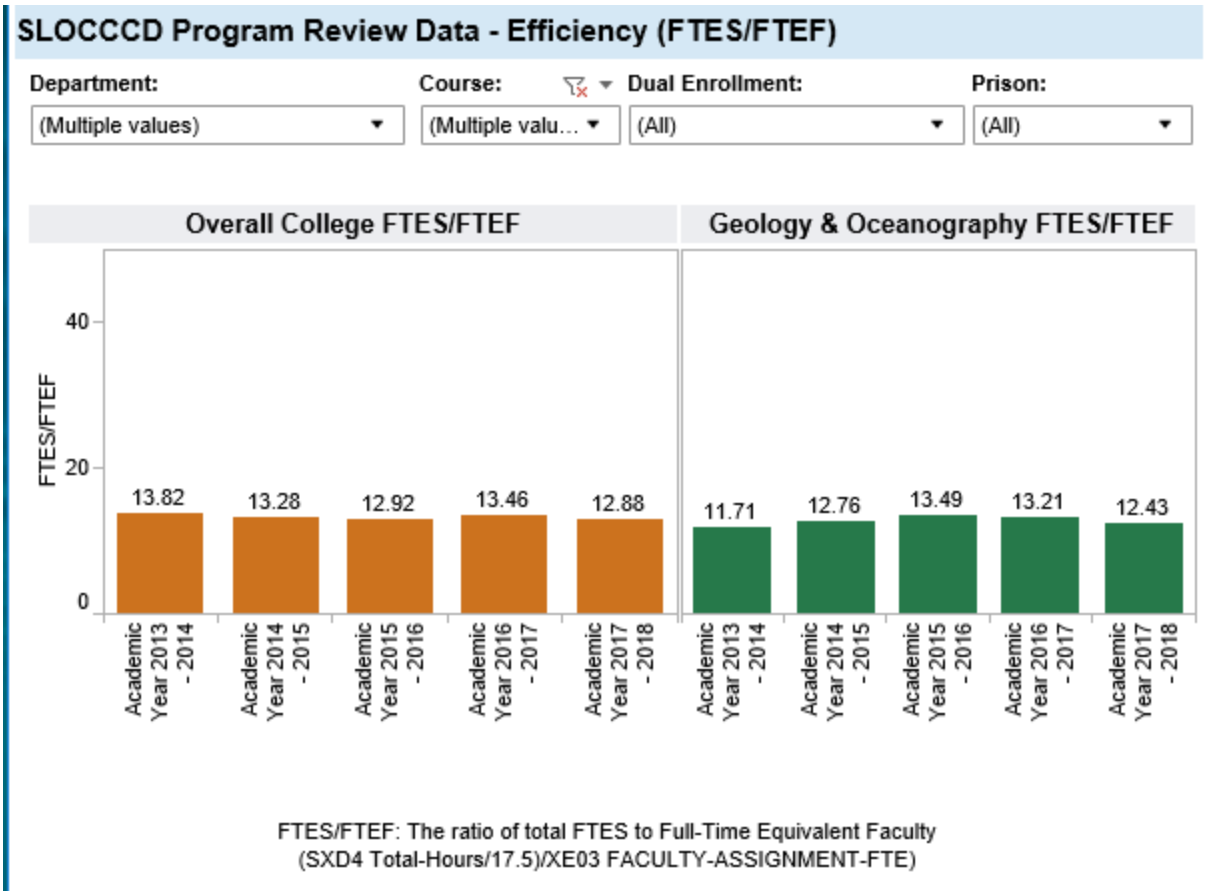


Combined Oceanography and Geology fill rates have mostly been on par with the rest of the college.

Part of the decreased fill rates is due to offering classes in larger classrooms with higher capacity.

General Efficiency (FTES/FTEF) (Insert Aggregated Data Chart)

Insert the data chart and explain observed differences between the program and the college.



The combined efficiency for Geology and Oceanography classes has risen from 2013-14 to keep pace with the rest of the college.

Student Success—Course Modality (Insert Data Chart)

Insert the data chart and explain observed differences between the program and the college.

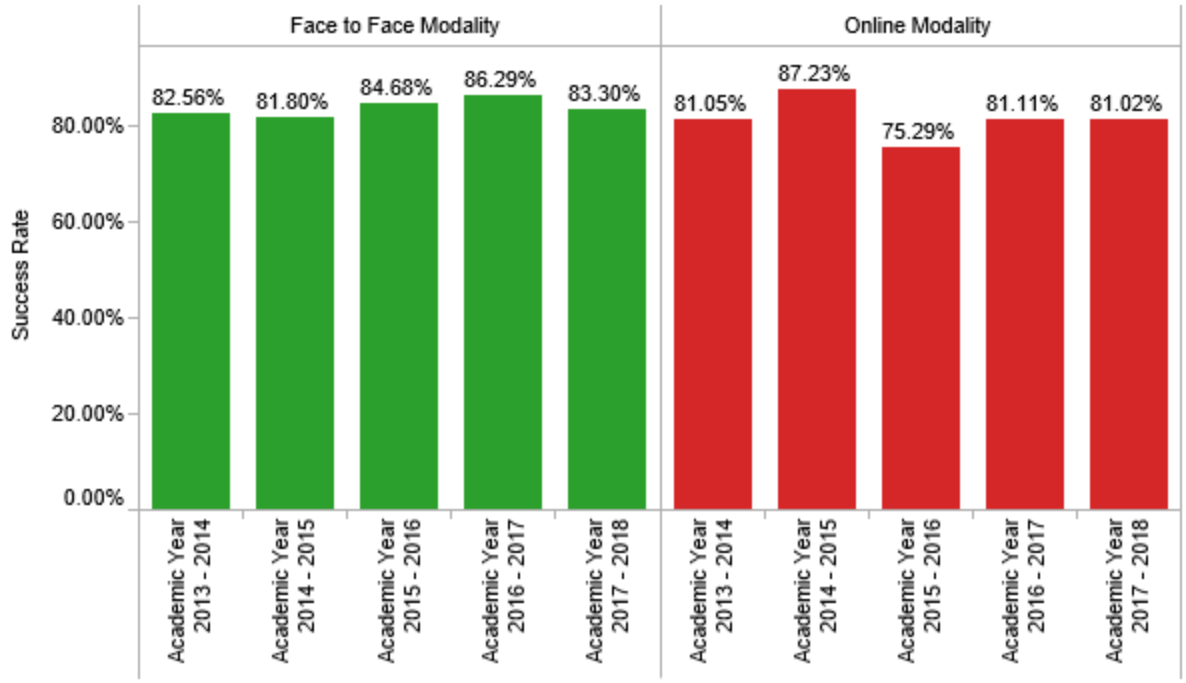
SLOCCCD Program Review Data: Successful Course Completion

Select Department: (All)

Course: (Multiple values)

Legend: Face to Face Modality; Online Modality

Successful Course Competion by Modality -Geology & Oceanography



Successful Course Competion by Modality Table - Geology & Oceanography

		Academic Year 2013 - 2014	Academic Year 2014 - 2015	Academic Year 2015 - 2016	Academic Year 2016 - 2017	Academic Year 2017 - 2018
Face to Face Modality	Department Success Rate	82.70%	81.94%	84.84%	86.19%	83.30%
	Total Department Enrollments	549.0	526.0	587.0	601.0	443.0
Online Modality	Department Success Rate	81.05%	87.23%	75.29%	81.11%	81.02%
	Total Department Enrollments	95.0	94.0	85.0	90.0	137.0

There was only one online course offered in EOS during this period. Except for 2015-16, success in the online modality matched or exceeded that in the face to face modality

Degrees and Certificates Awarded (Insert Data Chart)

Insert the data chart and explain observed differences between the program and the college.

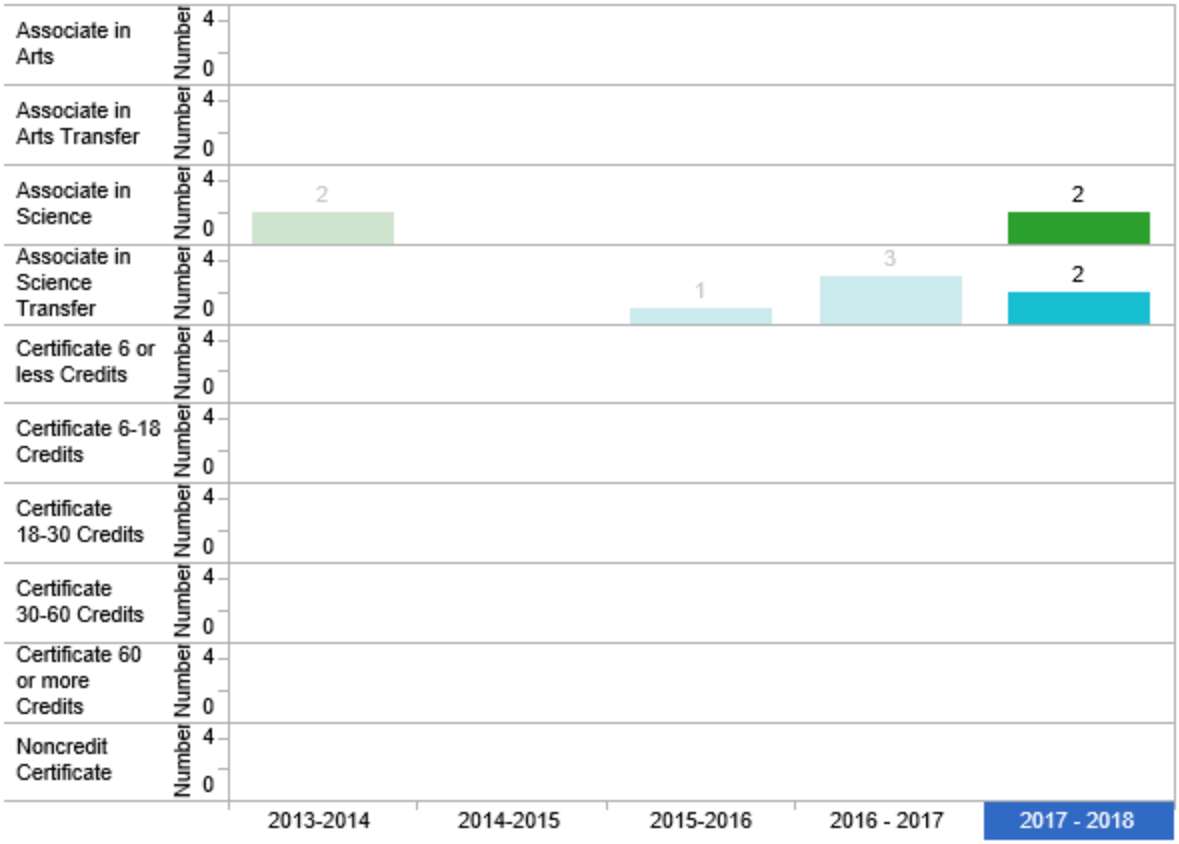
SLOCCCD Program Review Data: Degrees and Certificates Awarded

Program: Geology

Award Type: (All)

Program Awards

Top Code Description(s): Geology
Award(s): All



Program Awards Table

Award T..	Award	2013-2014	2014-2015	2015-2016	2016 - 2017	2017 - 2018
Associate in Science	Geology (AS)	2				2
	Total	2				2
Associate in Scienc..	Geology (AST)			1	3	2
	Total			1	3	2
Grand Total		2		1	3	4

Program Awards: The number of degress and certificates awarded by program type

General Student Success – Course Completion (Insert Aggregated Data Chart)

Review the Disaggregated Student Success charts; include any charts that you will reference. Describe any departmental or pedagogical outcomes that have occurred as a result of programmatic discussion regarding the data presented.

The success rates in geology and oceanography exceeded the overall college rate for every year.

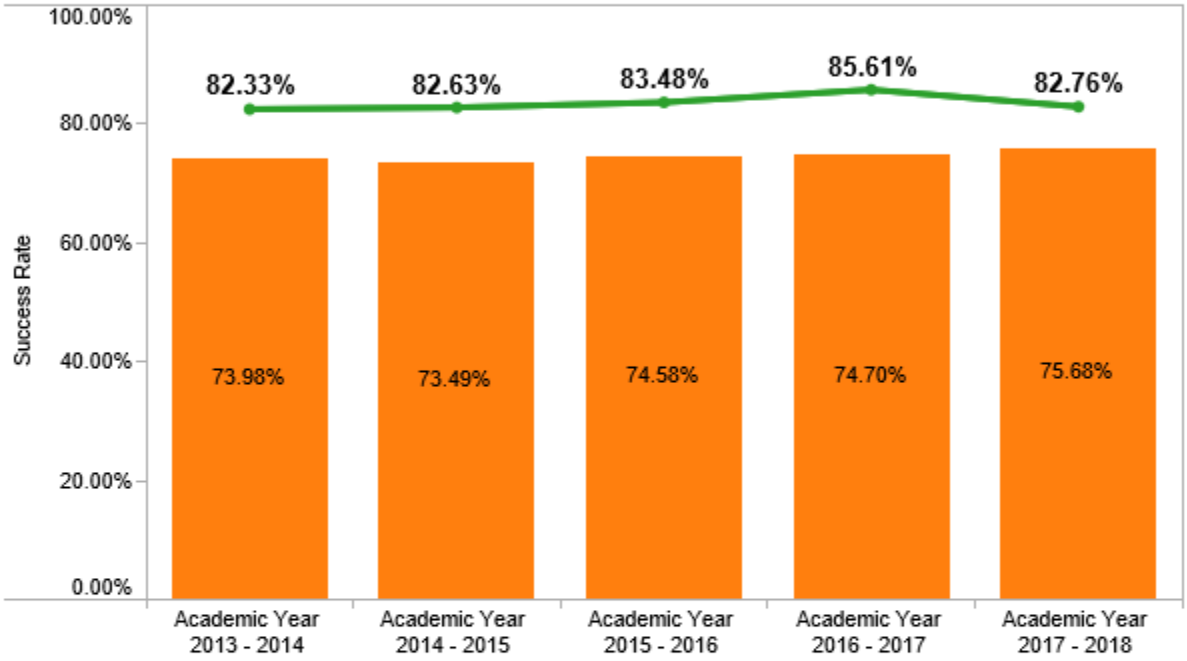
SLOCCCD Program Review Data: Successful Course Completion

Select Department: (All)

COURSE (Multiple valu...)

Measure Names
- Department Success Rate
- Overall College Success Rate

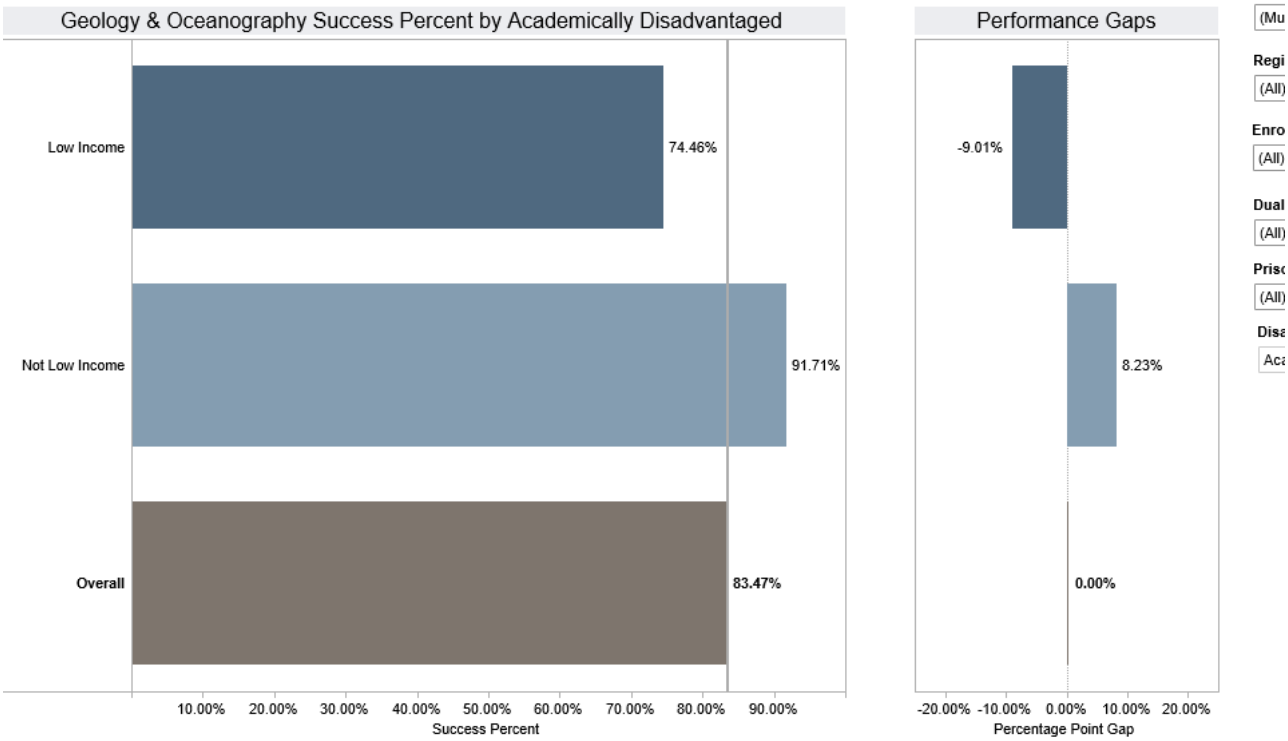
Successful Course Completion - Geology & Oceanography



Geology & Oceanography Success Rate Table

	Academic Year 2013 - 2014	Academic Year 2014 - 2015	Academic Year 2015 - 2016	Academic Year 2016 - 2017	Academic Year 2017 - 2018
Department Success..	82.33%	82.63%	83.48%	85.61%	82.76%
Total Enrollments	634	616	666	688	580

Success: The Percentage of student enrollments resulting in a final grade of "C" or better



The gap between low income and high income has narrowed but is still conspicuous. Part of this is a result of low-income students being unwilling or unable to purchase textbooks and Access cards required to use the web-based software. We dropped the use of clickers to reduce costs and instead direct students to access cards bundled with their textbooks.

This semester Foundation funds were used to purchase the required access cards for physical geology. Books on reserve are available in the library, but students are more successful when they have their own textbook.

OTHER RELEVANT PROGRAM DATA (OPTIONAL)

Provide and comment on any other data that is relevant to your program such as state or

national certification/licensure exam results, employment data, etc. If necessary, describe origin and/or data collection methods used.

PROGRAM OUTCOMES ASSESSMENT CHECKLIST AND NARRATIVE

CHECKLIST:

☒ SLO assessment cycle calendar is up to date.
☐ All courses scheduled for assessment have been assessed in eLumen.
☐ Program Sustainability Plan progress report completed (if applicable).

NARRATIVE:

Briefly describe program changes, if any, which have been implemented in the previous year as a direct result of the Program or Student Services Learning Outcomes Assessment. *If no program changes have been made as results of Program or Student Services Learning Outcomes Assessment, indicate: NONE.*

2019 INSTRUCTIONAL ANNUAL PROGRAM PLANNING WORKSHEET

PROGRAM PLANNING / FORECASTING FOR THE NEXT ACADEMIC YEAR

Briefly describe any program plans for the upcoming academic year. These may include, but are not limited to the following: *(Note: you do not need to respond to each of the items below). If there are no forecasted plans for the program, for the upcoming year, indicate: NONE.*

A. New or modified plans for achieving program-learning outcomes.
B. Anticipated changes in curriculum, scheduling or delivery modality. We anticipate offering Geology 212 in the Distance Education modality. We will also be offering a total of five GIS courses. These include GEOL 230 Introduction to GIS (formerly GEOL 225), GEOL 231 Advanced GIS (formerly GEOL 226), GEOL 232 Web Applications in GIS, GEOL 233 Data Acquisition and Management in GIS and GEOL 234 Remote Sensing. ENVS 200 is scheduled to run each spring semester, depending on demand.
C. Levels, delivery or types of services—The Oceanography 210 Lab should be expanded to two sections to accommodate student demand.
D. Facilities changes
E. Staffing projections—We need to get a full-time hire to maintain the continuity of the EOS program. We are mostly trying to maintain this program in the face of one FT retirement at the end of spring 2018, and a second FT retirement planned for spring 2021. This will leave this diverse program with no FT faculty leadership.
F. Other – The GIS program would benefit from having a server available for the software that is being used by all of the classes. Currently, the students in the DE courses have to load the software on their own computers, which has been causing problems when students run into installation issues. Having the software available on a remote server, using an enterprise login setup, would remove the software installation issues.

2019 INSTRUCTIONAL ANNUAL PROGRAM PLANNING WORKSHEET

PROGRAM SUSTAINABILITY PLAN PROGRESS REPORT

This section only needs to be completed if a program has an existing Program Sustainability Plan. Indicate whether objectives established in your Program Sustainability Plan have been addressed or not, and if improvement targets have been met.

Area of Decline or Challenge	**Identified Objective (Paste from PSP)**	**Planning Steps (Check all that apply)**	**Has the Improvement Target Been Met?**
Enrollment		☐ Identified ☐ Resources Allocated ☐ Implemented	Select one
Student Demand (Fill Rate)		☐ Identified ☐ Resources Allocated ☐ Implemented	Select one
Efficiency (FTES/FTEF)		☐ Identified ☐ Resources Allocated ☐ Implemented	Select one
Student Success – Course Completion		☐ Identified ☐ Resources Allocated ☐ Implemented	Select one
Student Success—Course Modality		☐ Identified ☐ Resources Allocated ☐ Implemented	Select one
Degrees and Certificates Awarded		☐ Identified ☐ Resources Allocated ☐ Implemented	Select one

If Program Sustainability Plan is still necessary, provide a brief description of how you plan to continue your PSP and update your PSP to remove any objectives that have been addressed and include any new objectives that are needed.