

# Science and Engineering Department

## Annual Unit Plan for Academic Year 2018-2019

October 2017

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### Describe Department/Unit

#### Connection to College Mission

The mission of the Science and Engineering Department is to provide the rigorous science and engineering foundation necessary for students to achieve the skills, knowledge, intellectual curiosity, and scientific literacy essential for a wide range of professional, technical and academic careers. For students pursuing careers outside of science, an understanding of the processes and an appreciation for science is provided. The department mission supports the mission of the district and college by striving to provide excellent educational programs, services, and opportunities for transfer and CTE students.

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### Report on Improvements Made and Gaps Identified in the Prior Year

#### Student Equity: Actions Taken

For the 2017-18 academic year, the Science department selected the collegewide Student Success Initiative:

1. Early communication and feedback for students: give a student engagement survey during the first week and discuss it with the class; and then give an early diagnostic assignment with meaningful feedback in the first couple of weeks of the semester.

#### Student Equity: Gaps to be Addressed

##### Gender: Male

##### Gap Identified:

During the 2016-17 academic year, male students were underrepresented in:

##### Biology:

28% Male versus 71% Female

(Note that this gender gap closely mirrors Cerro Coso Community College's collegewide gender gap of 40% male students versus 60% female students.)

Despite this gender gap, it is not reflected in the subject area's success and retention data. Biology's 5-year average retention rate data, when broken down by gender, is 88% retention for male students and 86% retention for female students. Similarly, Biology's 5-year average success rate data, when broken down by gender, is 68% success for male students and 71% success for female students.

##### Gender: Male

##### Gap Identified:

During the 2016-17 academic year, male students were underrepresented in:

##### Chemistry:

32% Male versus 67% Female

(Note that this gender gap closely mirrors Cerro Coso Community College's collegewide gender gap of 40% male students versus 60% female students.)

Despite this gender gap, it is not reflected in the subject area's success and retention data. Chemistry's 5-year average retention rate data, when broken down by gender, is 93% retention for male students and 93% retention for female students. Similarly, Chemistry's 5-year average success rate data, when broken down by gender, is 87% success for male students and 89% success for female students.

## **Gender: Female**

### **Gap Identified:**

During the 2016-17 academic year, female students were underrepresented in:

### **Physics:**

34% Female versus 66% Male

Despite this gender gap, it is not reflected in the subject area's success and retention data. Physics' 5-year average retention rate data, when broken down by gender, is 93% retention for female students and 98% retention for male students. Similarly, Physics' 5-year average success rate data, when broken down by gender, is 87% success for female students and 89% success for male students.

## **Gender: Male**

### **Gap Identified:**

During the 2016-17 academic year, male students were underrepresented in:

### **Physical Science:**

35% Male versus 65% Female

(Note that this gender gap closely mirrors Cerro Coso Community College's collegewide gender gap of 40% male students versus 60% female students.)

Despite this gender gap, it is not reflected in the subject area's success and retention data. Physical Science's 5-year average retention rate data, when broken down by gender, is 86% retention for male students and 83% retention for female students. Similarly, Physical Science's 5-year average success rate data, when broken down by gender, is 74% success for male students and 73% success for female students.

## **Ethnicity: African American**

### **Gap Identified:**

African American students achieved a low success rate in:

### **Biology:**

Biology's 5-year average success rate for African American students is 51%. This low success rate closely mirrors Cerro Coso Community College's collegewide success rate for African American students, which is 49%. Conversely, Biology's 5-year average retention rate for African American students is 85%. This retention rate is higher than Cerro Coso Community College's collegewide retention rate for African American students, which is 73%. Therefore, the data indicate that, while African American students are retained in Biology, they graduate from Biology at low rates of success.

This issue will be brought to the attention of Cerro Coso College's director of Student Equity in order to obtain potential intervention

strategies for improving the success rate of this student population.

## **Ethnicity: African American**

### **Gap Identified:**

African American students achieved a low success rate in:

### **Physical Science:**

Physical Science's 5-year average success rate for African American students is 53%. This low success rate closely mirrors Cerro Coso Community College's collegewide success rate for African American students, which is 49%. Physical Science's 5-year average retention rate for African American students is 69%, which is also relatively low compared to other student populations. This retention rate is similar to Cerro Coso Community College's collegewide retention rate for African American students, which is 73%.

This issue will be brought to the attention of Cerro Coso College's director of Student Equity in order to obtain potential intervention strategies for improving the success rate of this student population.

## **Outcomes Assessment: Actions Taken**

### **Actions taken in the prior academic year**

N/A

### **Assessments completed in the prior academic year**

N/A

## **Outcomes Assessment: Gaps to be Addressed**

## **Program Review: Actions Taken**

### **General Sciences**

#### **Year of Last Program Review:**

Spring 2017

#### **Actions Taken in the Prior Year to Address Strategies:**

The time period between the program review and now has been too short to address the program review strategies.

#### **Strategies Still to be Addressed:**

- A. Assess the level of on-site options at other sites, with focus on laboratory classes.
- B. Complete assessment of all course SLOs.
- C. Assess how badly the Main Building Modernization has affected the Science offerings at IWV if/after the project is eventually completed.

D. The department estimates the need for either 2-3 dedicated wet lab portable buildings regardless of cost to continue long term or for the department to return to the main building with written guarantees from KCCD that there will be no disruptions (unlikely). This must happen by July 2018 or the department will take necessary and appropriate action otherwise.

E. Modify the General Science Program to have the following 4 Emphases:

Biology modeled after the UC Biology pathway

Chemistry modeled after the UC Chemistry pathway

Physics modeled after the UC Physical Science pathway

Engineering Transfer Preparation modeled after the UC Physical Science pathway

Chemical Engineering transfer students would be advised to take CHEM C111, C113, C221 and C223.

F. Maintain Awareness of the ADT degrees. If unit relief happens, consider the development of an ADT degree, but always with the UC pathway in mind. If the UC and CSU's are still permitted to 'opt out' of the ADT guarantee, then the ADT degree will be dropped.

G. Predicated upon main building laboratory access and a new curriculum system, incorporate an undergraduate research program in the chemistry discipline.

H. Continuously consult with the respective professional societies, transfer institutions and scientific peers.

## Annual Planning: Actions Taken

**Department faculty will strive to become more familiar with the skills advocated by the Academy for College Excellence.**

**The department will investigate the possibility of developing an Undergraduate Research Program.**

The goal of developing an undergrad research program has been delayed do to a lack of lab space. This goal will be implemented when lab space is once again available.

**The department will oversee remodel of science labs at KRV, Tehachapi, and ESCC.**

The ESCC renovations are currently in progress at the Mammoth campus and are being monitored. The KRV renovations have not yet begun.

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## Review of Current Year Initiatives

### Reminder of Initiatives for the Current Year

#### 90% SLO Evaluations

The Science department will need access to a working SLO database in order to more easily upload SLO data. This database should soon be available.

#### Contingency Plan for a Science Modular

N/A

## Maintain Communication with the All Sites

N/A

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## Plan Initiatives for Next Year

### Initiatives for Next Academic Year

#### Advertise and Motivate Students to Apply for STEM Scholarships

Is this part of a multiyear initiative?

Yes

#### Specific Action Steps to be Taken:

The Science department will create and maintain a database of Science Technology Engineering and Math (STEM) related scholarships that are applicable for Cerro Coso Community College's science and math students. This database will include the underutilized local STEM scholarships that are specifically available for Cerro Coso students and it will also include any applicable statewide and nationwide STEM scholarship opportunities. This database of STEM scholarships will be advertised to the Science department's students several times each semester, and students will be encouraged to apply for them. Once the database and advertisement mechanisms are mature, the database will also be made available to the Math department.

#### Lead Measure of Success:

A lead measure for this initiative will be the creation of the Science department's database of STEM scholarship opportunities.

Another lead measure will be the number of science course sections and students that receive consistent invitation to apply for scholarships in the STEM database.

Are any of the lead measures identified above lacking assessment instruments?

No

Does the department request help to develop these instruments?

No

#### Lag Measure of Success:

The lag measure for this initiative will be the number of students who apply for the STEM scholarships advertised to them.

Another lag measure will be the number of students who actually receive STEM scholarships.

#### Person Responsible:

The department chair will create the scholarship database and each instructor will advertise it to their students

#### Other

This initiative addresses the cost of college for students by offering scholarship opportunities.

Which strategic goal does this initiative address?

Goal 3: Ensure Student Access

## **Create a Database of Students who Graduate with a Science Degree**

**Is this part of a multiyear initiative?**

Yes

**Specific Action Steps to be Taken:**

The Science department will create a mechanism for tracking the future academic and/or professional careers of its students who graduate with a science degree. This mechanism will consist of an end-of-the-semester questionnaire that gathers contact information for any students graduating with a science degree. This questionnaire will also gather information concerning the education institution or employer that the student will be joining after graduation, along with the student's future goals at his or her new location. Ideally, the information in this database would be updated and maintained over the years so that former students are tracked long after they have graduated from Cerro Coso Community College.

**Lead Measure of Success:**

A lead measure for this initiative will be the creation of a questionnaire for students graduating from Cerro Coso with a science degree.

**Are any of the lead measures identified above lacking assessment instruments?**

No

**Does the department request help to develop these instruments?**

No

**Lag Measure of Success:**

A lag measure for this initiative will be the number of former science students tracked within the Science department's student database.

**Person Responsible:**

The department chair will create the questionnaire and each instructor will administer it to their students

**It addresses a program review strategy**

Information about the future success of our students will allow the Science department to better determine the effectiveness of our Science program.

**Which strategic goal does this initiative address?**

Goal 1: Maximize Student Success

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## **Evaluate Resource Needs**

### **Facilities**

The Science department's ability to offer biology and chemistry lab courses at the IWV campus is severely impacted due to the Main Building's renovation project. Without access to the Science department's dedicated lab space in the Main Building, lab courses have used improvised lab space within the West Wing's Industrial Arts instruction space. The use of this temporary lab space creates limitations on lab procedures used in class, access to lab equipment and supplies, flexibility in course scheduling, section

size, and the overall morale of students and instructors alike.

The Science department proposes that its lab courses should be offered in the Main Building's dedicated lab space as soon as possible. If safety and logistics allow for it, the Science department would like to move back to the Main Building at the earliest possibility.

## Information Technology

None

## Marketing

None

## Professional Development

None

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## Staffing Requests

### 1000 Category - Certificated Positions

#### Full-Time Faculty Replacement in Biology

**Location:**

ESCC Bishop, ESCC Mammoth Lakes

**Justification:**

During the 2016-2017 academic year, the Science department was given approval to hire a full-time faculty replacement Biology instructor for the ESCC sites. This approval was given because the lone Biology faculty member at ESCC announced that the Spring 2017 semester would be his last semester of teaching for the college before he retired. During the Spring 2017 semester, the replacement position was advertised and candidates were interviewed, but the interview process did not result in a successful hire. Therefore, this position will be continuously requested until a successful hire is made. The justification for this position can be found in the 2017-2018 annual unit plan that was submitted during the Fall 2016 semester.

### 2000 Category - Classified Staff

#### Laboratory Technician I

**Location:**

Ridgecrest/IWV

**Salary Grade:**

39.5 (This is an assumption)

**Number of Months:**

Fluctuating, 1300 hours annually, 12 months (This is an assumption)

**Number of Hours per Week:**

Fluctuating, 1300 hours annually, 12 months (This is an assumption)

**Salary Amount:**

Between \$2,091.20 and \$2,954.81 per month (This is an assumption)

**Justification:**

The Science department's current laboratory technician has announced her retirement. Her final month working for the college will be September 2017. Therefore, this position will be continuously requested until a successful replacement hire is made.

1. Explain why the work of this position cannot be assigned to current staff.

This laboratory technician position is responsible for:

- the purchasing of biology and chemistry lab consumables for all college campuses and sites
- the monitoring of supply levels of biology and chemistry consumables for all college campuses and sites
- the purchasing of new and/or replacement science equipment for all college campuses and sites
- the scheduling of service and/or repair requests for biology and chemistry lab equipment
- helping organize, share, and transport lab consumables and equipment between all college campuses and sites
- helping prepare the labs equipment and consumables for weekly biology and chemistry labs at the IWV campus
- helping monitor the lab students during the weekly biology and chemistry labs at the IWV campus
- helping monitor the safety of the lab environment at the IWV campus

2. Describe the impact on the college if the position is not filled.

Without a laboratory technician to run the day-to-day operations of the lab environment, biology and chemistry labs would be severely impacted. Full-time faculty would have to receive extra release time to devote to the day-to-day operations of the lab environment instead of working as full-time instructors of students. Also, without the central organization of one lab technician, the preparations and planning of the weekly labs for all campuses and sites would suffer unforeseen scheduling conflicts. Furthermore, without the extra set of trained eyes in the lab environment, student safety could be compromised.

3. Is a temporary employee currently performing the work of this position? (Y/N)

The position will become vacant after September 2017.

4. How is the work assigned to this position presently accomplished?

The work is currently assigned to a Laboratory Technician I position.