



**Science and Engineering Department
Annual Unit Plan for Academic Year 2015-16
Planning Year 2014**

DESCRIPTION OF DEPARTMENT/UNIT

Department Mission/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.

STUDENT EQUITY

Student Equity

Science Department

Gender ratios mirror college (62F/38M). The department serves a higher proportion of younger students than the college as a whole (19 and younger: 25% in departments vs. 15% college). African Americans and Hispanics are slightly under-represented in the department vs. the college as a whole (3% and 30% vs. 5% and 36%). Whites are slightly over-represented (53% vs. 47%)

Biology

No apparent equity gaps exist. Females are slightly over-represented compared to the college as a whole (70% vs. 63%). Ethnic representation mirrors college as a whole. Retention and success within the subject is not significantly different than the college-wide rates. Within ethnic subgroups the lowest success rate is for African Americans at 48%; this exceeds college-wide success rates of 41% for the same



sub-group.

Chemistry

No apparent equity gaps exist. Gender and ethnic ratios are not significantly different than the college as a whole.

Engineering

Gender ratios are completely reversed: only 14% of enrollment for 2013-2014 were female vs. 63% collegewide. Younger students are also over-represented vs. the college as a whole. African American and American Indians are completely absent from the subject; Hispanics are under-represented (27% vs. 36% collegewide).

Physical Science

Gender and age ratios roughly mirror the college as a whole. The only significant ethnicity gap occurs with Hispanics who make up only 23% of enrollments vs. 36% collegewide.

Physics

Gender ratios are completely reversed: females make up 30% of the enrollment vs. 63% collegewide. Students 19 and younger make up 42% of the enrollment vs. 15% collegewide. Students older than 40 rarely enroll in the subject.

REVIEW AND PLANNING

a. Progress Made on Program Review

The Liberal Arts: Math and Science Program Review has been completed by John Stenger-Smith (October, 2015). General Sciences Program Review will need to be completed by Fall 2016. Engineering Program's first review will take place Fall of 2015. A member of the Department will participate in Cerro Coso's General Education Program Review. The department will assist and provide input into the GE Program Review.



b. Progress Made on Outcome Assessment. *If more lines are needed, place cursor in the bottom right box, press [Tab].*

Semester Assessed	SLO/AUO	Target Missed/Gap Detected	Improvements Designed	When Reassessed
BIOL C255 Spring 2014	SLO 1. Define key physiological terms and apply basic physiological concepts.	No gap detected 92% correct	None	Spring 2018
BIOL C255 Spring 2014	SLO 2. Relate cellular chemistry to cellular metabolism and functions.	Target missed 58% correct Chemistry is a particular weakness for many Physiology students	As chemistry is not a prerequisite for the course, an attempt is made to provide students with one or two lectures to prepare them for the chemistry required for successful comprehension of human physiology.	Spring 2018
BIOL C255 Spring 2014	SLO 3. Apply the fundamentals of chemistry and cell biology towards an understanding of cell function and cell determination.	No gap detected 78% correct	As chemistry is not a prerequisite for the course, an attempt is made to provide students with one or two lectures to prepare them for the chemistry required for successful comprehension of human physiology.	Spring 2018
BIOL C255 Spring 2014	SLO 4. Apply an understanding of how cell and tissue structures dictate their functions.	Target missed 68% correct	Discipline faculty will discuss ways to improve student success of this SLO.	Spring 2018

BIOL C255 Spring 2014	SLO 5. Describe how the major organ systems function to maintain homeostasis in the human body.	No gap detected 73% correct	Discipline faculty will discuss ways to improve student success of this SLO.	Spring 2018
BIOL C255 Spring 2014	SLO 6. Apply genetics to an understanding of human reproduction, development and disease.	No gap detected 80% correct	None	Spring 2018
BIOL C262 Spring 2014	SLO 1 Compare and contrast cell metabolism and the chemical characteristics of prokaryotic and eukaryotic cells.	No gap detected 73% correct	Discipline faculty will discuss ways to improve student success of this SLO.	Spring 2018
BIOL C262 Spring 2014	SLO 2 Apply the fundamentals of chemistry and cell biology towards an understanding of prokaryotic and eukaryotic cell communication, structure, growth, and division.	No gap detected 73% correct	Discipline faculty will discuss ways to improve student success of this SLO.	Spring 2018
BIOL C262	SLO 3 Describe basic	No gap detected 80% correct	None	Spring 2018

Spring 2014	microbial genetics concepts and the evolutionary forces which act on the genome.			
BIOL C262 Spring 2014	SLO 4 Examine the interaction of microorganisms and humans and their impact on the environment.	No gap detected 80% correct	None	Spring 2018
BIOL C262 Spring 2014	SLO 5 Relate current molecular and biochemical technologies to their uses in medical research.	No gap detected 73% correct	Discipline faculty will discuss ways to improve student success of this SLO.	Spring 2018
BIOL C262 Spring 2014	SLO 6 Compare and contrast different mechanisms used by various pathogens to invade host organ systems and cause disease.	No gap detected 73% correct	Discipline faculty will discuss ways to improve student success of this SLO.	Spring 2018

c. Progress Made on Department/Unit Initiatives

Goal 1

Continue to Build a ranked, all-encompassing, forward-looking list of equipment need by the Science and Engineering Department in the next 5 years taking all disciplines and college sites into account.

1. *Connection to College Strategic Goals:* Strategic Plan 3: Seek opportunities to enhance the development and use of resources.
2. *Specific internal* or external** condition(s) the goal is a response to:* We will likely not achieve the level of equipment availability found at larger colleges, but our students' education should not suffer because they attend a small rural college. Our part time faculty and students often comment on supply and equipment deficiencies.
3. *Action Plan:* We will have focus group meetings with each scientific discipline to focus on needs over next 5 years, followed by a department meeting to prioritize among disciplines.
4. *Measure of Success:* A ranked list of equipment need by the Science and Engineering Department in the next 5 years, with a purchasing schedule and possible funding source.

Progress on Goal 1:

As a department we have failed to achieve this goal. This list does not appear to exist or, if it does, it cannot be located.

Goal 2

Provide data driven success and completion assessments of all courses that have recently had enforceable prerequisites incorporated.

1. *Connection to College Strategic Goals:* Strategic Plan : Success and completion
2. *Specific internal* or external** condition(s) the goal is a response to:* Improving Student success and completion.
3. *Action Plan:* Use data and analyses to determine which courses are in most need of an enforceable prerequisite..
4. *Measure of Success:* Data comparing student success from previous years with those of the most recent 2 semesters with enforceable prerequisites.

Progress on Goal 2:

English 70 became an enforceable prerequisite for BIOL C251 Human Anatomy, BIOL C255 Human Physiology, and BIOL C262 General Microbiology in the Fall of 2013. We have observed the following (very preliminary) results:

BIOL C251 Human Anatomy:

Retention has moved from a 4-year average of 88.4% to 85.9% after the prerequisite.

Success has moved from a 4-year average of 69.6% to 78.8% after the prerequisite (a 13.2% increase in the rate of success).

BIOL C255 Human Physiology:

Retention has moved from a 4-year average of 86.0% to 89.9% after the prerequisite.

Success has moved from a 4-year average of 66.1% to 70.8% after the prerequisite.

BIOL C262 General Microbiology:

We are unable to assess the effect of the prerequisite because this course was not taught before the prerequisite was in place.

Goal 3

Develop a local Cerro Coso College Transfer Certificate.

1. *Connection to College Strategic Goals:* Strategic Plan : Success and completion
2. *Specific internal* or external** condition(s) the goal is a response to:* Track Engineering Students
3. *Action Plan:* Develop a certificate that removes most if not all of the General Education requirements since Engineering is one of the most unit-intensive majors.
4. *Measure of Success:* Data demonstrating completion of this certificate and compare it to the current program. Provide input in to the General Education Program review committee.

Progress on Goal 3:

No progress was made on this goal.

d. Department/Unit Initiatives for Next Academic Year. *If more strategies needed, copy and paste additional boxes.*

Initiative 1: Develop resources and facilities to support science offerings at all sites.

1. *College Strategic Objective(s) addressed:* **1, 2, 3, and 5**
2. *Action Plan:* **The Department Chair will visit all sites and, with the help of discipline faculty and site managers, assess resource and facility needs at ESCC, KRV, and EKR. Additionally, with the help of site managers, the Department Chair will oversee the summer, 2015, planned remodel of science labs at EKR and ESCC. All sites will be properly equipped with the necessary supplies, equipment, and facilities before courses are offered.**
3. *Measure of Success:* **Labs at ESCC, KRV, and EKR are properly equipped for the courses offered.**
4. *Expected Completion Date:* **Fall 2015**
5. *Person Responsible:* **Department Chair**
6. *Which of the following is primarily true of this strategy? Choose one.*

- It is designed to improve internal unit operations
 It is designed to increase student success

7. If the strategy is designed to increase student success, which of the following areas of the student experience does it address? Choose as many as apply.

- Intake Remediation First Year 2nd Year/Program Completion Post-Graduation

Initiative 2: Continue to develop and extend industry and educational partnerships.

1. College Strategic Objective(s) addressed: **3, 4, 5**

2. Action Plan: **Department faculty will establish educational, industry, and government agency partnerships in an effort to develop a pipeline of students, financial support, and student internship opportunities.**

3. Measure of Success: **A least one faculty member from the department will attend the Annual Aerospace Valley STEMposium and other related activities.**

4. Expected Completion Date: **Summer 2016**

5. Person Responsible: **Department Chair**

6. Which of the following is **primarily** true of this strategy? Choose one.

- It is designed to improve internal unit operations
 It is designed to increase student success

7. If the strategy is designed to increase student success, which of the following areas of the student experience does it address? Choose as many as apply.

- Intake Remediation First Year 2nd Year/Program Completion Post-Graduation



Initiative 3: Develop Associate Degrees for Transfer (ADT) for chemistry, biology, and physics.

1. College Strategic Objective(s) addressed: **1, 3, 4**

2. Action Plan: **When state templates become available and there is General Education relief, we will develop the CHEM, BIOL, and PHYS Associate Degrees for Transfer (ADT).**

3. Measure of Success: **The ADT for CHEM, BIOL, and PHYS have been completed.**

4. Expected Completion Date: **Summer 2016**

5. Person Responsible: **Department Chair and fulltime faculty discipline experts.**

6. Which of the following is primarily true of this strategy? Choose one.

It is designed to improve internal unit operations

It is designed to increase student success

7. If the strategy is designed to increase student success, which of the following areas of the student experience does it address? Choose as many as apply.

Intake

Remediation

First Year

2nd Year/Program Completion

Post-Graduation



RESOURCE NEEDS

a. Facilities

ESCCM

The science lab at ESCCM will undergo a major renovation/expansion during the summer, 2015. The student laboratory area will be enlarged to accommodate 32-35 students (from the present 24). In addition, a laboratory storage, prep area will be constructed adjoining the teaching laboratory. This expansion has been necessary to support the increase in science offerings that have laboratory components.

KRV

The KRV site will undergo a major remodel during the summer, 2015. The Science and Engineering Department would like to be involved in planning and furnishing the science laboratory. As this is a rented space, laboratory benches will need to be mobile.

b. Information Technology

None

c. Marketing

[Drawing on the information provided in department/unit review and planning, evaluate your next year's needs in this area.]

d. Professional Development

[Drawing on the information provided in department/unit review and planning, evaluate your next year's needs in this area.]

e. Staffing

Science and Engineering



STEM faculty in the ESCC LAC have been very beneficial to developing engagement in the science classes. If STEM funding is available in the future, we hope to continue to allocate a few hours per week per adjunct faculty in the ESCC LAC.

We would like to request a Lab Tech position for the ESCC Science Department. We believe that with the five to six science classes at ESCC, many taught by adjunct faculty, a Lab Tech is essential. We believe that a Lab Tech position could support both the science program and the Studio Arts Transfer Degree at ESCC.

RESOURCE REQUESTS (Note: All items must be prioritized.)

- a. **1000 Category.** Please indicate below any requests for temporary or new permanent certificated positions. (Do not request adjunct instructors for normal teaching assignments as this is captured in the Academic Affairs division plan.) *If more lines are needed, place cursor in the bottom right box and press [Tab].*

None							
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Full-Time Faculty Staffing Justification:

None



b. **2000 Category.** Please indicate below any requests for temporary or new permanent classified staff. Include labor amounts only; benefits will be calculated separately. *If more lines are needed, place cursor in the bottom right box and press [Tab].*

Position Title	Location	Priority: 1 = high 2 = med 3 = low	Strategic Plan goal addressed by this position	Salary Grade	Number of Months	Number of Hours per Week	Salary Amount	Funding Source (check <i>one</i>): G = General Fund, O = Other G O	
Laboratory Assistant	ESCC	1	1,2,3,5			15		G	

Classified Staffing Justification. *If more than one position requested, copy and paste additional boxes.*

1. Describe how the position is linked to your unit’s mission and goals, recent Program Review or SLO assessment gaps, planning assumptions, and/or the College’s strategic plan.
We believe that with the five to six science classes at ESCC, many taught by adjunct faculty, a Lab Tech is essential. We believe that a Lab Tech position could support both the science program and the Studio Arts Transfer Degree at ESCC.

2. Explain why the work of this position cannot be assigned to current staff.
Extensive lab setup and cleanup responsibilities exceed the amount of time adjunct faculty are reasonably expected to be available.

3. Describe the impact on the college if the position is not filled.
May impact student success and future enrollments. The science department at ESCC has never had the assistance of a lab tech. We would continue to offer a safe and effective laboratory experience for our students.

c. **4000 Category.** Use the space below to itemize and explain budget requests in the category of supplies and equipment. *If more lines are needed, place cursor in the bottom right box and press [Tab].*



Describe resource requested	Location	Priority: 1 = high 2 = med 3 = low	Strategic Plan goal addressed by this resource	Provide a detailed rationale for the requested resource. The rationale should refer to your unit's mission and goals, recent Program Review or SLO assessment gaps, planning assumptions, and/or the College's Strategic Plan	Estimated amount of funding requested	Will this be one-time or on-going funding?	Funding Source (check <u>one</u>): G = General Fund, O = Other	
							G	O
Instructional Supplies	ESCCB	1	1,2,3,5	Student success in BIOL 105, 125, 251	2500	On-going	G	
Instructional Supplies	ESCCB	1	1,2,3,5	Student success in GEOG 111	200	On-going	G	
Instructional Supplies	ESCCM	1	1,2,3,5	Student success in BIOL 105, 255, 262	2250	On-going	G	
Instructional Supplies	ESCCM	1	1,2,3,5	Student success in GEOG 111, PHYS 111, PHYS 113	1200	On-going	G	
Instructional Supplies	IWV	1	1,2,3,5	Student success in BIOL 105 (2), 111, 125, 251 (2), 255 (2), 262	7250	On-going	G	
Instructional Supplies	IWV	1	1,2,3,5	Student success in CHEM 101, 111 (2), 113, 221, 223	4250	On-going	G	
Instructional Supplies	IWV	1	1,2,3,5	Student success in PHSC 105, PHSC 125 (3) PHYS 111, 113, 211	3200	On-going	G	
Instructional Supplies	KRV	1	1,2,3,5	Student success in BIOL 105	500	On-going	G	
Instructional Supplies	KRV	1	1,2,3,5	Student success in PHSC 105	200	On-going	G	
Instructional Supplies	EK	1	1,2,3,5	Student success in BIOL 105	500	On-going	G	
Instructional Supplies	EK	1	1,2,3,5	Student success in PHSC 132	200	On-going	G	
Course Field Trips	ESCC	1	1,2,3,5	Necessary to support student success in biology (2) and geography (2) courses	200	On-going	G	
Course Field Trips	IWV	1	1,2,3,5	Necessary to support student success in biology (3), chemistry (6), and physical science (1) courses	500	On-going	G	
Course Field Trips	KRV	1	1,2,3,5	Necessary to support student success in biology (1) and physical science (1) courses	100	On-going	G	
Course Field Trips	EK	1	1,2,3,5	Necessary to support student success in biology (1) and physical science (1) courses	100	On-going	G	
Employee Travel	ESCC	1	1,2,3,5	Necessary to move and maintain equipment necessary for student success	200	On-going	G	
Employee Travel	IWV	1	1,2,3,5	Necessary to move and maintain equipment necessary for student success	100	On-going	G	



Describe resource requested	Location	Priority: 1 = high 2 = med 3 = low	Strategic Plan goal addressed by this resource	Provide a detailed rationale for the requested resource. The rationale should refer to your unit's mission and goals, recent Program Review or SLO assessment gaps, planning assumptions, and/or the College's Strategic Plan	Estimated amount of funding requested	Will this be one-time or on-going funding?	Funding Source (check <u>one</u>): G = General Fund, O = Other	
							G	O
Employee Travel	KRV	1	1,2,3,5	Necessary to move and maintain equipment necessary for student success	300	On-going	G	
Employee Travel	EK	1	1,2,3,5	Necessary to move and maintain equipment necessary for student success	300	On-going	G	

Commercial washer (to be shared with Industrial Science)	IWV	1	1,2,3,5	Necessary to provide safe and hygienic protective lab coats for biology, chemistry (and industrial arts) students	1500	One-time	G	
Commercial dryer (to be shared with Industrial Science)	IWV	1	1,2,3,5	Necessary to provide safe and hygienic protective lab coats for biology, chemistry (and industrial arts) students	1500	One-time	G	
Commercial washer/dryer installation	IWV	1	1,2,3,5	Necessary to provide safe and hygienic protective lab coats for biology, chemistry (and industrial arts) students	500	One-time	G	
UV Gel Scanner	IWV	2	1,2,3,5	Necessary for student learning in biology	500	One-time	G	
Water baths (1)	KRV	1	1,2,3,5	Necessary for student learning in Survey of A&P	400	One-time	G	
Water bath (1)	ESCCB	1	1,2,3,5	Necessary for student learning in biology	400	One-time	G	
Human skeleton model	KRV	1	1,2,3,5	Necessary for student learning in Survey of A&P	600	One-time	G	
Histology slides	KRV	1	1,2,3,5	Necessary for student learning in Survey of A&P	600	One-time	G	
Laboratory furniture	KRV	1	1,2,3,5	Necessary for student learning in Survey of A&P	6894	One-	G	



6 student lab benches K-log Item # DST-430						time		
Human spinal column model	KRV	1	1,2,3,5	Necessary for student learning in Survey of A&P	200	One-time	G	
Ohaus Scout Pro Balance (2) 6000g	ESCCM	1	1,2,3,5	Necessary for student learning in PHYS C111	700	One-time		O ¹
Mass and Hanger Set (2)	ESCCM	1	1,2,3,5	Necessary for student learning in PHYS C111	160	One-time		O
Hooked Mass Set (2)	ESCCM	1	1,2,3,5	Necessary for student learning in PHYS C111	100	One-time		O
Meter Sticks 6-pack (2)	ESCCM	1	1,2,3,5	Necessary for student learning in PHYS C111	60	One-time		O
Pasco Stopwatch (2)	ESCCM	1	1,2,3,5	Necessary for student learning in PHYS C111	60	One-time		O
Super Pulley with Clamp (8)	ESCCM	1	1,2,3,5	Necessary for student learning in PHYS C111	240	One-time		O
Braided Physics String (2)	ESCCM	1	1,2,3,5	Necessary for student learning in PHYS C111	50	One-time		O
Projectile Launcher (2)	ESCCM	1	1,2,3,5	Necessary for student learning in PHYS C111	740	One-time		O
Super Pulley Force Table (2)	ESCCM	1	1,2,3,5	Necessary for student learning in PHYS C111	400	One-time		O
2.2 m Classic Dynamics System (2)	ESCCM	1	1,2,3,5	Necessary for student learning in PHYS C111	1080	One-time		O
Ballistic Pendulum Without Launcher (2)	ESCCM	1	1,2,3,5	Necessary for student learning in PHYS C111	1060	One-time		O
Complete Rotational System (2)	ESCCM	1	1,2,3,5	Necessary for student learning in PHYS C111	1870	One-time		O
Smart Timer (2)	ESCCM	1	1,2,3,5	Necessary for student learning in PHYS C111	500	One-time		O



Freefall Adapter (2)	ESCCM	1	1,2,3,5	Necessary for student learning in PHYS C111	420	One-time		O
Precision Digital Multimeter Component Tester (6)	ESCCM	1	1,2,3,5	Necessary for student learning in PHYS C113	600	One-time		O
Student Power Supply (18V DC, 3Amp) (2)	ESCCM	1	1,2,3,5	Necessary for student learning in PHYS C113	300	One-time		O
Alligator Clip Leads (Set of 10) (2)	ESCCM	1	1,2,3,5	Necessary for student learning in PHYS C113	60	One-time		O
Banana Plug Cord Black (5 pack) (2)	ESCCM	1	1,2,3,5	Necessary for student learning in PHYS C113	40	One-time		O
Alligator Clip Adapters (2)	ESCCM	1	1,2,3,5	Necessary for student learning in PHYS C113	40	One-time		O
Coulomb's Law Apparatus (2)	ESCCM	1	1,2,3,5	Necessary for student learning in PHYS C113	120	One-time		O
Dry Electric Field Mapping Apparatus (2)	ESCCM	1	1,2,3,5	Necessary for student learning in PHYS C113	220	One-time		O
Decade Resistance Box (2)	ESCCM	1	1,2,3,5	Necessary for student learning in PHYS C113	510	One-time		O
Snap Circuits, SC500R Educational, Electronics Training Program (2)	ESCCM	1	1,2,3,5	Necessary for student learning in PHYS C113	400	One-time		O
Basic Current Balance (2)	ESCCM	1	1,2,3,5	Necessary for student learning in PHYS C113	360	One-time		O
Coil, Primary & Secondary (4)	ESCCM	1	1,2,3,5	Necessary for student learning in PHYS C113	200	One-time		O
Galvanometer (4)	ESCCM	1	1,2,3,5	Necessary for student learning in PHYS C113	110	One-time		O

¹other: private funding



d. 5000 Category. Use the space below to itemize and explain budget requests in the category of service, utilities, and operating expenses. *If more lines are needed, place cursor in the bottom right box and press [Tab].*

Describe resource requested	Location	Priority: 1 = high 2 = med 3 = low	Strategic Plan goal addressed by this resource	Provide a detailed rationale for the requested resource. The rationale should refer to your unit's mission and goals, recent Program Review or SLO assessment gaps, planning assumptions, and/or the College's Strategic Plan	Estimated amount of funding requested	Will this be one-time or on-going funding?	Funding Source (check <u>one</u>): G = General Fund, O = Other
None							G O

e. 6000 Category. Use the space below to itemize and explain budget requests in the category of capital outlay. *If more lines are needed, place cursor in the bottom right box and press [Tab].*

Describe resource requested	Location	Priority: 1 = high 2 = med 3 = low	Strategic Plan goal addressed by this resource	Provide a detailed rationale for the requested resource. The rationale should refer to your unit's mission and goals, recent Program Review or SLO assessment gaps, planning assumptions, and/or the College's Strategic Plan	Estimated amount of funding requested	Will this be one-time or on-going funding?	Funding Source (check <u>one</u>): G = General Fund, O = Other
None							G O