CAL POLY
Academic Senate

Meeting of the Academic Senate
Tuesday, June 5, 2018
UU 220, 3:10 to 5:00 pm

I.   **Minutes**: none.

II.   **Communication(s) and Announcement**: Introduction of 2018-2019 Senators (pp. 3-4).

III.   **Reports**:
       A.   Academic Senate Chair:
       B.   President's Office:
       C.   Provost: (p. 5).
       D.   Vice President for Student Affairs: (p. 6).
       E.   Statewide Senate:
       F.   CFA:
       G.   ASI:

IV.   **Consent Agenda:**

ITEMS TO BE CONSIDERED BY ACADEMIC SENATE				
Program Name or Course Number, Title	**ASCC recommendation/ Other**	**Academic Senate**	**Provost**	**Term Effective**
ME 437 Nuclear Energy Power Generation (4), 4 lectures	Reviewed and recommended for approval by 5/17/18.	On the 6/5/18 consent agenda.		
ME 438 Nuclear Power Plant Design (4), 4 lectures	Reviewed and recommended for approval 5/17/18.	On the 6/5/18 consent agenda.		
ME 439 Nuclear Power Plant Operations (4) 4 lectures	Reviewed 4/19/18; additional information requested from the department. Recommended for approval 5/17/18.	On the 6/5/18 consent agenda.		
B.A. Modern Languages and Literatures – change to B.A. Spanish	Reviewed and conditionally recommended for approval 5/17/18. Recommended for approval 5/22/18.	On the 6/5/18 consent agenda.		

V.   **Special Reports:**
       A.   **[TIME CERTAIN 4:30 P.M.] Interfolio, Electronic RPT Dossier, and Evaluation Workflow Report** by Al Liddicoat, Vice Provost for Academic Affairs and Ken Brown, Faculty Affairs Committee Chair (p. 7).

VI.   <u>**Business Items**</u>:
    A. **Resolution on Migration of Current Areas D4 Classes to Area E:** Brenda Helmbrecht, GE Governance Board Chair, second reading (p. 8).
    B. **Resolution on Change of Degree Designation from B.A. to B.S. for Liberal Arts and Engineering Studies (LAES):** David Gillette and Michael Haungs, LAES Co-Directors, second reading (pp. 9-13).
    C. **Resolution on Proposed New Degree Program: Master of Science in Food Science**: Stephanie Jung, Professor on behalf of the Food Science Faculty, second reading (pp. 14-57) Annexes available at https://cpslo-my.sharepoint.com/:w:/g/personal/stjung_calpoly_edu/ERyeuUbM8x5OpeOqtbJ87r4BJtlQVHJl3CtERAk7SeR4Hw
    D. **Resolution on Proposed New Degree Program: Master of Science in Environmental Sciences and Management:** Chris Surfleet, Professor of Natural Resources Management and Environmental Sciences, second reading (pp. 58-101).
    E. **Resolution to Update Campus Policy on Faculty Office Hours:** Jennifer Klay, Chair of the Office Hours Task Force, first reading (pp. 102-109).
    F. **Resolution Condemning Recent Events at Lambda Chi Alpha:** Paul Rinzler, Senator and CLA Caucus Chair, first reading (p. 110).
    G. **Resolution on Limiting Campus Spending for Speakers Invited by Student Clubs:** Maggie Bodemer, Senator and Carrie Langner, Psychology and Child Development professor, first reading (pp. 111-112).
    H. **Resolution on Minors:** Brian Self, Curriculum Committee Chair, second reading (pp. 113-117).

VII.   <u>**Discussion Item(s)**</u>:

VIII. <u>**Adjournment**</u>:

04.20.18 (gg)

CALIFORNIA POLYTECHNIC STATE UNIVERSITY
San Luis Obispo, California

2018-2019 ACADEMIC SENATE SENATORS

COLLEGE OF ARCHITECTURE AND ENVIRONMENTAL DESIGN (5 representatives/1 vacancy)

NAME	DEPT	OFFICE	@calpoly.edu	TERM END
Bass, Beverly	LandArch	62864	bjbas	2020
Greve, Adrienne	City&RegPlan	61474	agreve	2019
Starzyk, Greg	ConstMgmt	62110	gstarzyk	2019
White, Emily	Arch	62036	ewhite14	2019
VACANT				**2020**

COLLEGE OF AGRICULTURE, FOOD AND ENVIRONMENTAL SCIENCES (6 representatives/1 vacancy)

NAME	DEPT	OFFICE	@calpoly.edu	TERM END
Campos, Fernando	AniSci	66337	lcamposc	2019
Dobson Peterson, Jean	Wine&Viti	62770	jdodsonp	2020
Edwards, Mark	AniSci	62599	msedward	2019
Hurley, Sean	Agribus	65050	shurley	2020
Surfleet, Chris	NRMES	62743	csurflee	2019
VACANT				**2020**

COLLEGE OF BUSINESS (5 representatives)

NAME	DEPT	OFFICE	@calpoly.edu	TERM END
Alexander, Benjamin	MHRIS	65305	balexa02	2020
Carr, Chris	Acctg	62657	ccarr	2020
De la Fuente, Javier	IndTech	61607	jdelafue	2019
Durham, Garland	Finance	61758	gbdurham	2019
Fisher, Eric	Econ	62964	efisher	2020

COLLEGE OF ENGINEERING (8 representatives)

NAME	DEPT	OFFICE	@calpoly.edu	TERM END
Colvin, Kurt	I&MEngr	62633	kcolvin	2020
Danowitz, Andrew	ElecEngr	62756	adanowit	2020
Falessi, Davide	CompSci	62344	dfalessi	2020
Khosmood, Foaad	CompSci	62911	foaad	2019
Pan, John	I&MEngr	62540	pan	2019
Schuster, Peter	MechEngr	62976	pschuste	2019
Self, Brian	MechEngr	67993	bself	2019
Vakalis, Ignatios	CompSci	66285	ivakalis	2020
LoCascio, Jim	MechEngr	62375	jlocasci	2019

COLLEGE OF LIBERAL ARTS (10 representatives)

NAME	DEPT	OFFICE	@calpoly.edu	TERM END
Alaniz, Ryan	SocSci	66261	ralaniz	2019
Anderson, Christian	WorldLang	61620	cander55	2020
Bridger, Sarah	History	62617	sbridger	2019
D'Avignon, India	Music	62503	idavigno	2020
Farber, Charmaine	GraphComm	61158	cfarber	2019
Fernflores, Rachel	Philo	62330	rfernflo	2019
Kolodziejski, Lauren	CommStudies	62535	lkolodzi	2020
Navarro, Jose	EthStudies	66268	jnavar17	2020
Thompson, John	WorldLang	61212	jjthomps	2019
Williams, Jason	Psyc. & C.D.	62843	jwilli26	2020
Laver, Gary	Psyc&CD	62538	glaver	2020

COLLEGE OF SCIENCE AND MATHEMATICS (11 representatives)

NAME	DEPT	OFFICE	@calpoly.edu	TERM END
Camp, Charles	Math	61661	camp	2020
Carroll, Jennifer	Chem&Bio	61654	jacarrol	2020
Gillen, Glen	Physics	62364	ggillen	2019
Glanz, Hunter	Stats	62792	hglanz	2019
Gutierrez, Thomas	Physics	62455	tdgutier	2019
Hackman, Christine	Kine	61363	chackman	2020
Kantorowski, Eric	Chem&Biochem	62796	ekantoro	2020
Lin, Joyce	Math	65554	jlin46	2020
Schaffner, Andrew	Statistics	61545	aschaffn	2019
Smith, Heather	Statistics	66128	hsmith	2020
Tomanek, Lars	BioSci	62437	ltomanek	2019

PROFESSIONAL CONSULTATIVE SERVICES (4 representatives)

NAME	DEPT	OFFICE	@calpoly.edu	TERM END
O'Clair, Katherine	Library	62690	koclair	2020
Parker, Pamela	Health Srvcs	61211	paparker	2019
Weddige, Kristi	CSM,Advsng	62192	kweddige	2020
Wolfe-Chandler, Christina	UnivAdvsng	65735	crwolfe	2019

CAL POLY
Academic Affairs
Office of the Provost

Academic Senate Meeting | June 5, 2018
Report from Provost Enz Finken

Updates:

- The latest round of RPT is complete: 84 files reviewed for fourth, fifth and sixth probationary years and 58 files were reviewed for tenure and/or promotion. Letters were sent June 1.

- Faculty are encouraged to participate in their college spring commencement ceremony. Attendance is also encouraged at the various cultural commencement events as schedules allow. Dates for all ceremonies are available online: https://commencement.calpoly.edu/spring

Student Affairs Report to Senate
June 5, 2018
Keith Humphrey
Vice President for Student Affairs

- Thank you to the faculty who helped to participate in the review of the diversity and inclusion plans for social fraternity and sororities.
- We are looking forward to seeing all of our faculty at commencement June 16 and 17 to celebrate our student's achievements. We anticipate ceremonies lasting approximately 2 hours to 2 hours and 15 minutes in length. And we are hoping for foggy days like we have been having recently!
- I want to encourage faculty who are interested in helping to re-invent Greek Life at Cal Poly to make time to participate in the special faculty session with our consultant, Dr. Juan Guardia, who will be on campus June 7 and 8 to meet with stakeholder groups. A detailed schedule will be released soon.

Interfolio

- **New Online System for Faculty Evaluations**

- **Faculty WPAF submission**
  - Dossier - What is it? How to use it

- **Evaluators and workflow**

- **Implementation Fall 2018**
  - Probationary years 1-4 online
  - Probationary years 5 and 6 optional
  - Promotion optional

- **Training and business process guides (BPG)**
  - May 2018
    - Logging into Interfolio
    - Accessing the dossier the first time
    - Guidelines for file naming
    - Uploading files into the dossier
  - August 2018
    - Candidate -Attaching documents to a review case
    - Candidate – Submitting a case for review
    - Candidate – Accessing a review
    - Candidate – Uploading a rebuttal
    - Committee member - Reviewing cases
    - Committee chair – Uploading reviews
    - Committee chair – Moving a case forward
    - Other BPG's as needed

- **Timeline**
  - Week of May 7th – Interfolio Dossier online
  - August 1st – Cases available for candidates
  - August 1st through Sept 20th – Training by Academic Personnel
    - Scheduled workshops
    - By appointment
  - September 26th and 27th Interfolio onsite for training
    - Faculty candidate attaching documents and submission of case
    - Navigating review cases
    - College and department staff training

- **Questions?**

Contacts
  - Ken Brown – Faculty governance
  - Al Liddicoat – Personnel questions
  - Jen Myers – General questions, technical support and feedback

Adopted:

ACADEMIC SENATE
Of
CALIFORNIA POLYTECHNIC STATE UNIVERSITY
San Luis Obispo, CA

AS-___-18

RESOLUTION ON MIGRATION OF CURRENT AREA D4 CLASSES TO AREA E

1 2 3	WHEREAS,	The Chancellor's Office has revised EO 1100, the CSU policy on GE breadth requirement; and
4 5 6	WHEREAS,	The revised policy "is intended to establish a common understanding of the requirements for CSU General Education Breadth"; and
7 8 9	WHEREAS,	The revised policy maintains a GE pattern that specifies Areas A, B, C, D, and E; and
10 11 12	WHEREAS,	Cal Poly's current GE pattern does not include CSU Area E: Lifelong Learning and Self-Development; and
13 14	WHEREAS,	Cal Poly's current GE pattern includes Subareas D4: Self Development; and
15 16 17	WHEREAS,	For the sake of clarity, Cal Poly should bring its GE program into alignment with the CSU pattern articulated in EO 1100; and
18 19 20	WHEREAS,	Subarea D4 classes already reflect the self-development content of CSU Area E, as described in the revised EO 1100; and
21 22 23	WHEREAS,	The content of CSU Area E has been expanded to include "student success strategies" and "information literacy"; therefore be it
24 25 26 27	RESOLVED:	That Subarea D4: Self-Development will be renamed Area E; Lifelong Learning and Self-Development, beginning with the 2019-21 Cal Poly catalog, and be it further
28 29 30	RESOLVED:	That all current Area D4 courses will be moved to the new Area E, and be it further
31 32 33	RESOLVED:	That the existing Subarea D4 learning objectives and criteria will be revised to reflect the description of CSU Area E in the revised EO 1100, including the expanded content and the emphasis on lifelong learning.

Proposed by: General Education Governance Board
Date: May 9, 2018

Adopted:

ACADEMIC SENATE
Of
CALIFORNIA POLYTECHNIC STATE UNIVERSITY
San Luis Obispo, CA

AS-___-18

RESOLUTION ON CHANGE OF DEGREE DESIGNATION FROM B.A. TO B.S. FOR LIBERAL ARTS AND ENGINEERING STUDIES (LAES)

1	WHEREAS,	The Liberal Arts and Engineering Studies (LAES) program is
2		requesting that its current BA in Liberal Arts and Engineering Studies
3		be designated as a BS in Liberal Arts and Engineering Studies; and
4		
5	WHEREAS,	No course work or program structure must be altered to
6		accommodate a switch from BA to BS, the LAES degree as it stands
7		meets all the requirements for the BS degree and is a major that fits
8		with those typically awarding BS degrees; this recommended change
9		has been carefully evaluated and endorsed by the College of
10		Engineering Curriculum Committee, the College of Liberal Arts
11		Curriculum Committee, is endorsed by the Deans of both the Colleges
12		of Engineering and Liberal Arts, and has been endorsed by the
13		Academic Senate Curriculum Committee; therefore be it
14		
15	RESOLVED:	That the Academic Senate of the California State University of San Luis
16		Obispo approve the request to change the designation of the B.A. for
17		Liberal Arts and Engineering Studies to a B.S.

Proposed by:	LAES Co-Directors: Dr. David Gillette and Dr. Michael Haungs
Date:	May 10, 2018

Proposal for Revised Degree Designation, BA to BS for LAES

Program: Liberal Arts and Engineering Studies
Colleges: College of Engineering and College of Liberal Arts
University: Cal Poly, San Luis Obispo, CA.
Proposed by LAES Co-Directors: Dr. David Gillette, Dr. Michael Haungs

Introduction

The Liberal Arts and Engineering Studies (LAES) program is a hybrid undergraduate degree that combines Engineering and the Liberal Arts. The program has been running since 2009, with over 70 students currently enrolled, and over 70 successfully-employed graduates. Coursework for the major is split between courses offered by the Colleges of Engineering and Liberal Arts, with slightly more courses required from the College of Engineering to provide students with the technical training needed to be successful in their chosen fields.

Due to the prerequisite demands required for student access to and success with the upper-level engineering courses in this degree, the first two years of study for the LAES degree are very similar to the curricula for most BS engineering degrees at Cal Poly, requiring all the same support courses in calculus, physics and chemistry. Even though the LAES program brings together engineering and liberal arts study and scholarship, the overall focus of the degree is on the scientific, mathematical and technological concepts that serve as the foundation for all the program's core courses and then culminate in senior project work that involves design, invention, leadership, and applied problem solving. The bulk of our alumni's careers are clustered in engineering and technical fields. Since inception, the LAES degree has always had an intense focus on the STEM areas for scholarship, production and professional development. This proposal requests changing the degree from its current BA designation to a BS designation in order to align it with other BS programs per Cal Poly's academic policies[1] and to better capture the technical focus of the degree our students earn. Letters of support from the Deans of both colleges are attached.

Rationale for Change

The use of the BA designation for the degree was the result of early discussions at Cal Poly about how to identify this emerging degree, which was (and remains) the first and only degree in the CSU jointly offered between the Colleges of Engineering and Liberal Arts. One of the initial points offered regarding designating LAES as a BA was due to the fact that LAES was not seeking ABET accreditation. Once the program was up and running, it quickly became clear that ABET accreditation has little to no impact upon how the CSU (and other state and national educational institutions) determine the difference between what classifies as a BA or a BS curriculum, the latter of which "is normally awarded in such majors as the physical and biological sciences, engineering, and agriculture." As the program moved from its pilot to fully-approved phase with the CSU Chancellor's office, faculty, students and commercial partners working with LAES began to ask why LAES was a BA and not a BS degree—all these parties

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[1] https://academicprograms.calpoly.edu/content/academicpolicies/policies-undergrad/ba-bs-difference

have pointed out that based on their in-depth understanding of the LAES curriculum, program scope, and commercial/community project work, the BS designation for the degree would be a more accurate representation of the degree.

We request that the LAES degree now be designated as a BS-granting degree so it will be accurately represented to incoming students, to potential employers of our students, and to other programs around the country who (in various ways) are attempting to build LAES programs of their own. No course work or program structure must be altered to accommodate this switch from BA to BS. The LAES degree has, from inception, required students to progress through a BS-level curriculum and therefore our students should now, going forward, receive a proper BS designation on their degree.

Cal Poly's Academic Senate Curriculum Committee distinguishes between the two degrees as follows (emphasis added):

1. Both the Bachelor of Arts and the Bachelor of Science degrees should have a reasonable balance of three components:
   - A major providing depth of preparation in an academic or professional field.
   - General education providing basic university-level education in science and mathematics, in the social sciences, in the arts and humanities, and in human communication.
   - Electives chosen to fit the student's preferences or needs. (It is recognized that the number of these electives may be fewer in some degrees because of accreditation requirements, but the inclusion of some electives is important.)
2. Bachelor of Arts Degree:
   - is usually less specialized than a Bachelor of Science degree.
   - requires a minimum of 180 quarter units for the degree; 36 units are required in the major, of which at least 18 units are at the 300-400 level.
   - is normally awarded in such majors as the languages, literature, other humanities, and history.
3. *Bachelor of Science Degree:*
   - *typically involves technical fields.*
   - *requires a minimum of 180 quarter units for the degree; 54 units are required in the major, of which at least 27 quarter units are at the of 300-400 level.*
   - *is normally awarded in such majors as the physical and biological sciences, engineering, and agriculture.*

Curriculum Overview

The LAES degree requires 180 units of study to complete the degree. 40 units of that work must be completed in the same math, physics and chemistry courses required for all BS engineering degrees at Cal Poly. This is then accompanied by 35 additional units of course work students must complete with engineering courses, with at least 4 units of those courses completed at the 300-400 level, and at least 4 units completed at the 400 level or above. By the time students complete the degree, they have received at least 27 quarter units of technical work at the 300-400 level, consistent with the requirements for a BS degree.

When the STEM-based prerequisites in the program (math, physics, chemistry) are combined with their required engineering concentrations, students in LAES are required to successfully complete 75 units of study in STEM courses offered from Cal Poly's BS-granting programs. If students then use engineering courses to complete their electives for the degree as well, they finish the LAES degree with at least 89 units of study with STEM-based coursework out of a

180-units degree, just two units short of exactly half of their degree requirements. Because LAES students are required to also complete the Area F courses for GE, and the Area B2 courses in life sciences, those additional eight units of study, if counted as STEM-related work, would mean that LAES students spend more than half their study in LAES with STEM-related courses. This more than fulfills the requirements for a BS degree designation at any college in the CSU and elsewhere in the state of California. The table below shows a summary breakdown of the technical units required in the degree.

LAES Degree Requirements, focusing on STEM-related courses

40 units	STEM prerequisites; Math, engineering Physics, engineering Chemistry
35 units	Engineering Concentration (4 hours at 300-400, 4 hours at 400 or above)
75 units	**Total: STEM Prerequisites + Engineering Concentration**
4 units	Area B2 Life Sciences
4 units	Area F Technology
83 units	**Total: STEM prerequisites + Engineering Concentration + GE**
14 units	Total Possible Engineering courses used for Electives, brought in with transfer
97 units	**Total: STEM prerequisites + Engineering Concentration + GE + Electives**
180 units	Total: Full Degree with Engineering + Liberal Arts + GE

In summary, the LAES degree meets all the requirements for the BS degree: it involves a technical field; requires 54 units in the major, with the minimum 27 units of upper-division work; and is a major that fits with those typically awarding BS degrees (i.e., the physical and biological sciences, engineering, and agriculture). It should be noted BS degrees are granted in the College of Liberal Arts in Anthropology/Geography, Child Development, Graphic Communication, Journalism, and Psychology, and in the College of Science and Math in Liberal Studies, suggesting that the technical areas for the BS degree are somewhat broadly defined. Thus, LAES can be represented appropriately as another technical program at Cal Poly that grants the BS.

BA LIBERAL ARTS AND ENGINEERING STUDIES 2015-2017 *updated 10.03.16* Units Required 180

NOTE: This document can be used as a compact display of courses and other curricular requirements at the time of publication of the 2015-2017 catalog. The Degree Progress Report must be used to track students' progress in all degree requirements, throughout their Cal Poly career.

Note: No major or concentration courses may be selected as credit/no credit.

MAJOR COURSES (126-127)		Units
CHEM 124	Gen Chem/Engr (B3/B4)[1]	4
ENGL 149	Tech Writing for Engineers (A3)[1]	4
LAES 301	Proj-Based Learning	4
LAES 302	Adv Proj-Based Learning	4
LAES 461	Senior Project (or other approved senior project course)	4
LAES 462	Capstone Senior Seminar	4
MATH 141	Calculus I (B1)[1]	4
MATH 142	Calculus II (B1)[1]	4
MATH 143	Calculus III (B5)[1]	4
MATH 241	Calculus IV	4
MATH 244	Linear Analysis I	4
PHYS 141	General Physics IA	4
PHYS 132	General Physics II	4
PHYS 133	General Physics III	4
STAT 312/ 321/ 350		4
Engineering Concentration		34-35
(Minimum 8 units at 300-400 level)		
Liberal Arts Concentration or ICS		24
(Minimum 12 units at 300-400 level)		
Study Abroad or Global Perspectives courses		8
(300-400 level)		

GENERAL EDUCATION (GE) 40-52

72 units required, *20-32 of which are specified in Major, depending on conc*
Minimum of 12 units required at the 300 level.

Area A Communication		8
A1 Expository Writing	4	
A2 Oral Communication	4	
A3 Reasoning, Argument & Writing *(4 units in Major)[1]*		

Area B Science and Mathematics		4
B1 Mathematics/Statistics *(8 units in Major)1*		
B2 Life Science	4	
B3 Physical Science *(4 units in Major)[1]*		
B4 One lab with either B2 or B3		
B1-B5 Elective *(4 units in Major)[1]*		

Area C Arts and Humanities		16
C1 Literature	4	
C2 Philosophy	4	
C3 Fine/Performing Arts *(may be in concentration)*	0-4	
C4 Upper-division elective *(may be in concentration)*	0-4	

Area D/E Society and the Individual		20
D1 The American Exp (40404)	4	
D2 Political Economy	4	
D3 Comp Social Institutions	4	
D4 Self Dev (CSU Area E)	4	
D5 Upper-division elective	4	

Area F Technology (upper div) *(may be in concentration)*		4

FREE ELECTIVES [2,3] 1-14

OTHER DEGREE REQUIREMENTS:

- Cal Poly, Higher Ed, and Major GPA must all be at least 2.00
- For students admitted Fall 2016 and after, a grade of C- or higher is required in GE A1, A2, A3, and one GE B1 course

All students must complete:
- **United States Cultural Pluralism Requirement**
- **Graduation Writing Requirement**
- **60 units Upper Division (any 300-400 level classes)**
- **Upper Division units in the Major: 27**
- **Residency Requirements: See Degree Progress Report for details**

[1] Required in Major; also satisfies GE
[2] Students must complete 60 upper-division units and a total of 180 units overall. Additional units may be required.

[3] If GE courses are used to satisfy Support or Concentration requirements, additional units may be required to complete the 180 total unit requirement or 60 units of upper division.

Adopted:

ACADEMIC SENATE
Of
CALIFORNIA POLYTECHNIC STATE UNIVERSITY
San Luis Obispo, CA

AS-__-18

RESOLUTION ON PROPOSED NEW DEGREE PROGRAM:
MASTER OF SCIENCE IN FOOD SCIENCE

1 2 3 4 5	WHEREAS,	The Department of Food Science and Nutrition has a history of preparing Master students for careers in food science, such as food safety, food sensory, food chemistry, product development, and food engineering and processing; and
6 7 8 9 10 11 12 13 14	WHEREAS,	The purpose of the proposed Master of Science in Food Science is to provide graduate students with the knowledge, advanced critical thinking, skills, ethics and experiences necessary to address current and future food science related challenges, and meet the workforce demand in a sector of employment that is expected to increase with the difficulties and challenges to address growing world population, sustainability of our food production, and development of healthy and nutritious food; and
15 16 17 18 19 20 21	WHEREAS,	The faculty in the Food Science and Nutrition Department have the expertise to deliver a Master of Science in Food Science program that aligns with the most recent critical component elements identified by the Institute of Food Technologists: Food Safety & Defense, Food Health & Nutrition, Product Development, Food Processing & Packaging, and Sustainability; and
22 23 24 25 26	WHEREAS,	There is substantial interest by California Polytechnic, national and international students who desire the opportunity to pursue their education with a Master of Science in Food Science as a pathway to food science careers; and
27 28 29 30	WHEREAS,	Only our sister CSU institution Cal Poly Pomona and our competitor institution in the UC system, UC Davis, has a graduate degree in Food Science; and
31 32 33 34	WHEREAS,	The Food and Beverage processing in California accounts directly for $25.2 billion in value added and 198,000 jobs and is engaged in vital strategies to continue to produce and deliver food nationally and internationally, and Cal Poly graduates with a Master of

35		Science in Food Science will successfully contribute to these
36		efforts; therefore be it
37		
38	RESOLVED:	That the proposed new degree program for the Master of Science
39		in Food Science be approved.

Proposed by: Stephanie Jung, Professor, on behalf of the
Food Science Faculty
Date: May 10, 2018

CAL POLY

SAN LUIS OBISPO

Proposal for New CSU Degree

Master of Science in Food Science

Food Science and Nutrition Department
California Polytechnic State University
San Luis Obispo

Date

CSU DEGREE PROPOSAL

Faculty Check List

✓ **Title 5 requirements for proposed master's degree have been met, including:**

✓ minimum of 30 semester units of approved graduate work are required

✓ no more than 50% of required units are organized primarily for undergraduate students

✓ maximum of 6 semester units are allowed for thesis or project

✓ Title 5 requirements for master's degree culminating experience are clearly explained.

✓ for graduate programs, at least five-full time faculty with terminal degrees in appropriate disciplines are on staff.

1. PROGRAM TYPE

a. State-support

c. Delivery Type: Fully face to face

g. New Program

2. PROGRAM IDENTIFICATION

a) Campus

California Polytechnic State University, San Luis Obispo

b) Full and exact degree designation and title

Master of Science (MS) in Food Science

c) Date the Board of Trustees approved adding this program to the campus Academic Plan

March 2013

d) Term and academic year of intended implementation

Fall 2019

e) Total number of units required for graduation

45 quarter units

f) Name of department offering proposed degree. Please identify the unit that will have primary responsibility.

Food Science and Nutrition (FSN) Department

g) Name, title, and rank of the individuals primarily responsible for drafting the proposed degree major program. Listed by alphabetical order.

- Samir Amin, PhD, Associate Professor, Food Science and Nutrition Department
- Luis Castro, PhD, Assistant Professor, Food Science and Nutrition Department
- Gour Choudhury, PhD, Professor, Food Science and Nutrition Department
- Stephanie Jung, PhD, Professor, Food Science and Nutrition Department
- Robert Kravets, PhD, Associate Professor, Food Science and Nutrition Department
- Amy Lammert, PhD, Associate Professor, Food Science and Nutrition Department
- Amanda Lathrop, PhD, Associate Professor, Food Science and Nutrition Department

h) Statement from the appropriate campus administrative authority that the addition of this program supports the campus mission and will not impede the successful operation and growth of existing academic programs

Support letter from Mary Pedersen, Senior Vice Provost, Academic Programs and Planning (Appendix 1).

i) Any other campus approval documents that may apply (e.g. curriculum committee approvals)

Campus approval documents appear in **Appendix 2**.

j) Please specify whether this proposed program is subject to WASC Substantive Change review. The campus is required to either attach a copy of the WASC Sub-Change proposal or submit that document in lieu of the CSU proposal format

Submitted WASC Substantive Change Screening Form and notified on January 31, 2018 that no substantive change review will be necessary.

k) Proposed Classification of Instructional Programs (CIP) Code

CSU Code: 01131 Food Science; CIP: 01.1001

3. PROGRAM OVERVIEW AND RATIONALE

a) Rationale, including a brief description of the program, its purpose and strengths, fit with institutional mission, and a justification for offering the program at this time. The rationale may explain the relationship among the program philosophy, design, target population, and any distinctive pedagogical methods.

Brief Description/Purpose

This program is designed to graduate individuals with advanced knowledge and skills in food science. Content knowledge will include training to develop student expertise in food science themes ranging from food chemistry and food safety to product and process development. The program will also prepare graduates for advancement, specialization, and leadership in food science careers and governmental agencies such as Food and Drug Administration (FDA) or United States Department of Agriculture (USDA). Graduates who chose to further their education with doctoral studies will be prepared to do so.

The program curriculum will include a strong core of food science coursework and thesis units (29), plus 16 advisor-approved units.

A unique feature of the program is the required FSN 581 course, which is about sustainability in the food system. We strongly believe that our students need to be aware and prepared to deal with food sustainability and all the aspects that it involves, from food waste, sourcing of food ingredients and its consequences on the environment, to life-cycle analysis. In our knowledge, this program is the only one in the nation where such a requirement will be implemented.

This program will replace the current MS in Agriculture with a Specialization in Food Science. bit is, therefore, an elevation of the existing MS in Agriculture with a specialization in Food Science to an MS in Food Science.

Strengths

Program strengths include: 1) the strategic alignment of the program emphasis areas established to support the demanding job market and societal needs for professionals in these areas, and 2) an existing on-campus network of faculty experts that will provide the structure to graduate students with expertise in these various emphasis areas.

These strengths and unique features will attract a wide range of qualified candidates preparing for entry into high-demand professional careers and into doctoral degree programs in the various areas of food science. Graduates will possess a depth of knowledge in food sciences, practical skills relevant to the workforce demands of the 21st century, and collaborative dispositions indicative of professionals with a high capacity for leadership in diverse settings and populations.

Fit with Institutional Mission

Cal Poly Mission Statement

Cal Poly fosters teaching, scholarship, and service in a Learn by Doing environment in which students, staff, and faculty are partners in discovery. As a polytechnic university, Cal Poly promotes the application of theory to practice. As a comprehensive institution, Cal Poly provides a balanced education in the arts, sciences, and technology, while encouraging cross-disciplinary and co-curricular experiences. As an academic community, Cal Poly values free inquiry, cultural and intellectual diversity, mutual respect, civic engagement, and social and environmental responsibility.

Students admitted in this MS program in Food Science will most likely be involved in research projects that involve industry partners, which has been the practice in the past few years for the MS in Agriculture with a specialization in Food Science. It is the goal of the faculty to continue to have industry partners in the research projects, in which the MS students will be involved. This MS Food Science program therefore epitomizes Cal Poly's institutional mission, "promoting the application of theory to practice" over a choice of topics ranging from food science to meat science, food safety and sustainability. It is designed to "foster teaching, scholarship, and service in a learn-by-doing environment" where students and faculty are partners in discovery, through carefully-developed, outcome-oriented laboratories and classes. This MS will strive to integrate values of "free inquiry, cultural and intellectual diversity, mutual respect, civic engagement, and social and environmental responsibility" by exposing students to an array of academic, intellectual, and global themes relevant to society's most pressing demands in food science, including but not limited to food safety, production, consumption (with product development) and environment.

Justification for Offering the Program at This Time/Rationale

There are several factors that contribute to the need of this MS in Food Science and make this proposal justified at this time.

- One of them is the key role of the state of California in the food industry. According to a report published by the California League of Food Processors in January 2015, food and beverage processing is California's third largest manufacturing sector, responsible for a total

of 760,000 jobs. In the past couple of years, the food industry's demand for MS students has significantly increased, with the MS degree becoming the new norm and replacing the BS degree. There is an increased demand from the food industry for students who possess strong critical thinking skills. Such skills are emphasized within the proposed MS Food Science. The need for more students with a background in food science is illustrated by the letters of support we received from leaders of companies in the food industry (**Appendix 12**). As an example, Rob Neenan, President of the California League of Food Processors (CLFP), emphasizes that "the number of university graduates is not keeping pace with demand, especially with respect to students with graduate degrees" (**Appendix 12**).

- The need for graduate students with a background in food science will become increasingly salient as the population continues to grow, requiring our resources to be carefully managed. Such a challenge has to be addressed in a sustainable way, with graduates having the skill and ability to think critically and deliver the food that the population needs without compromising our natural resources, or the microbial safety of food.

- Also, there is an urgent need for healthy foods, which will continue to increase in the future. Food scientists have a key role to play in producing and developing healthy foods. This can be illustrated by the active role our professional organization, the Institute of Food Technologists (IFT), plays in these decisions. In May 2017, IFT submitted recommendations to the U.S. Food and Drug Administration (FDA) in establishing guidelines on healthy foods, which included but were not limited to the importance of the alignment of the definition of "healthy" food with the eating patterns recommended by the *2015–2020 Dietary Guidelines for Americans*.

The graduates from our program will have the skillset to be the scientists that the food industry needs to deliver healthy foods to the population, and therefore contribute to reducing and preventing obesity in the population.

- PhD programs in food science such as UC Davis, and out-of-state programs such as Purdue University, Cornell University, Iowa State University, Washington State University (for complete list please refer to the following website http://www.ift.org/community/students/graduate-directory.aspx), will be seeking students with rigorous MS training in food science to enter a wide range of research environments in all the food science arenas, including but not limited to food safety, food chemistry, sensory/product development, and sustainability. Cal Poly is well positioned to provide such graduates.

Currently, there are a total of 5 undergraduate food science programs in California. Only two of them, Cal Poly San Luis Obispo (BS Food Science with concentration in Advanced Food Science) and UC Davis, are approved by The Institute of Food Technologists.

The field of food science is important for many disciplines across campus. For example, for engineers, a career in the food industry could be an attractive option but they lack the specialized knowledge in Food Science. The same applies for students from chemistry, packaging, or microbiology. It is not unusual for students with an undergraduate degree in these fields to be interested in an MS in Food Science. These students might also be interested in taking some of our graduate courses, while being in another graduate program on campus.

Having students from other departments in our graduate courses will help ensure a critical mass of students for course enrollments, and provide support for diversity initiatives. The proposed program has much campus-wide support from a broad range of stakeholders. **Appendix 11** contains letters of support for this proposal from Heads/Chairs from the following departments/units/programs: Wine and Viticulture, Industrial Technology & Packaging, Animal Science, and the Cal Poly Dairy Innovation Institute. Support of various Departments through signed Memorandums (**Appendix 5**) was provided by the following Departments: Statistics, Animal Science, Chemistry & Biochemistry, Civil & Environmental Engineering, Microbiology)

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b) Proposed catalog description, including program description, degree requirements, and admission requirements. For master's degrees, please also include catalog copy describing the culminating experience requirement(s).

Proposed catalog description
The MS Food Science program is designed to prepare graduates for advancement, specialization, and leadership in food science careers. In addition, graduates will be prepared for further education in doctoral studies in food science and related fields.

Students will complete coursework and a research-based thesis conducted under the supervision of a committee chaired by the student's major professor. In addition to the committee chair, the student's committee must have a minimum of two other qualified members. One of the three committee members must be a member outside the Food Science and Nutrition Department.

Admission Requirements
A student shall at the time of enrollment:
- Have completed a four-year college course of study and hold an acceptable baccalaureate degree from an institution accredited by a regional accrediting association, or shall have completed equivalent academic preparation as determined by appropriate campus authorities.
- Be in good standing at the last college or university attended.
- Have attained a grade point average of at least 3.0 (A = 4.0) in the last 60 semester (90 quarter) units attempted or have earned a grade point average of at least 3.0 on the last degree completed by the candidate.
- Satisfactorily meet the professional, personal, scholastic, and other standards for graduate study, including qualifying examinations, as appropriate campus authorities may prescribe. Have your GRE results reported to Cal Poly Admissions (Institutional Code 4038) and self-report the results in your application.
- Students in the process of completing a baccalaureate degree may be admitted on a provisional basis, subject to proof of degree completion, if their cumulative GPA is at least 3.0. An official transcript showing degree completion must be submitted or the offer of admission will be withdrawn.

To be considered, students should fill an application for Graduate Admission via https://www2.calstate.edu/apply. The deadlines for application are specified at http://admissions.calpoly.edu/applicants/

- Program specific requirements must be submitted via Cal State Apply. These include:
  - o Statement of purpose
  - o Transcript(s) from institution granting bachelor's degree
  - o Curriculum Vitae
  - o Three letters of academic and/or professional recommendation.
  - o Results from Graduate Record Examination (GRE standard test); quantitative, verbal and writing scores should be at the 50th percentile or higher for consideration.
  - o Language proficiency requirement. This requirement does not apply if country of citizenship is listed on Cal Poly Admissions website: http://admissions.calpoly.edu/applicants/international/checklist.html All applicants who do not speak and write English as their primary language are required to complete the Test of English as a Foreign Language (TOEFL), taken within the last 2 years with a minimum score of 550 (paper version), 213 (computerized version), or 80 (internet based). Submit scores electronically to Institution Code: 4038.

Applicants who lack the required preparatory coursework in basic sciences must complete these courses (either before being admitted or once admitted). Basic sciences courses include the following:

- General Chemistry: CHEM 127 General Chemistry for Agriculture and Life Science I
  CHEM 128 General Chemistry for Agriculture and Life Science II
  CHEM 129 General Chemistry for Agriculture and Life Science III
- Organic Chemistry: CHEM 312 Survey of Organic Chemistry
  CHEM 212 Introduction to Organic Chemistry
  CHEM 216 Organic Chemistry I
  CHEM 217 Organic Chemistry II
- Biochemistry: CHEM 313 Survey of Biochemistry and Biotechnology
  CHEM 371 Biochemical Principles (CHEM 217 is required)
- Nutrition: FSN 210 Nutrition

Students can check the Cal Poly course catalog website to determine similarity with courses they might have taken in previous institutions. http://catalog.calpoly.edu/coursesaz/#c
They can also submit their request to the graduate coordinator of the MS Food Science program, who will be able to confirm the similarity of the course(s). Once admitted, if a student is lacking some of these courses, the student's committee will determine what courses the student should take, for a maximum of 12 units, based on his/her background and the type of research he/she will be focusing on.

All degree requirements, including catalog number, course title, and number of units
Required courses
All core requirements appear in **Table 3.b.1** below.

Table 3.b.1. Required Courses (29 units)

Core Courses		
Catalog number	Course title	Units
FSN 505	Orientation to graduate research	1
FSN 599	Thesis	9
STAT 513	Applied Experimental Design and Regression Models	4
SS 501	Research Planning	4
FSN 564	Chemistry of Food Systems	4
FSN 575	Advanced Food Safety	4
FSN 581	Food Science Seminar – Sustainability	3
	Total required coursework	29
Electives		
Supervisor-approved electives (400-500 level)	Varies with student's background. Some options are summarized based on by research emphasis area the student might have on Microbiology/Food Safety; Sensory/Product Development; Food Chemistry; Sustainability, Meat Science/Dairy Science (Refer to list below)	16
	Total units needed for graduation	45

Forms to submit

- A Working Formal Study Plan must be developed with a student's thesis committee chair and committee members and submitted before the end of the student's first quarter into the program.
- Graduate students must file a Formal Study Plan with the MS Food Science Graduate Coordinator within the first three weeks of the quarter they intend to graduate.
- An application for Graduation e-form needs to be submitted one quarter prior to the quarter of anticipated graduation.
- After the defense, a Master Thesis Approval Form needs to be submitted as well.

Steps to graduation are summarized on the graduate education website: grad.calpoly.edu/checklist-forms/checklist.html

Requirements

The Formal Study Plan must include at least 45 units of committee-approved graduate coursework (including degree-required and elective coursework). At least 60% of the units on the Formal Study Plan must be at the 500 level. A minimum GPA of 3.0 is required for coursework in the Formal Study Plan. All students must meet the University's current

Graduation Writing Requirement. In addition, all students must pass an oral defense of the thesis and satisfactorily complete the written thesis.

Culminating experience for master's degree

The thesis is based on independent, supervised research and must be approved by the thesis committee. The final copy of the thesis must meet the standards explained in the "Formatting Guidelines for Preparing Master's Theses and Project Reports" available from the Cal Poly Graduate Education Office, online at: http://grad.calpoly.edu/thesis/templates.html A copy of the thesis must be received and reviewed by the Thesis Editor in the Graduate Education Office. An oral defense of the rationale and objectives for the thesis project is recommended, no later than the end of the 2nd quarter of year 1, and an oral defense of the findings of the thesis project is required. Upon completion of any required corrections, the student submits the electronic thesis/project report to the DigitalCommons@CalPoly, a digital archive for the University. These steps must be completed before the degree is awarded. The Master thesis submission process is summarized at http://grad.calpoly.edu/thesis/thesis.html

4. CURRICULUM

Describe outcomes (also sometimes known as goals) for the 1) institution, 2) program, and for 3) student learning. Institutional learning outcomes (ILOs) typically highlight the knowledge, skills, and dispositions all students are expected to have upon graduating from an institution of higher learning. Program learning outcomes (PLOs) highlight the knowledge, skills, and dispositions students are expected to know as program graduates. PLOs are more narrowly focused than ILOs. Student learning outcomes (SLOs) clearly convey the specific and measureable knowledge, skills, and/or behaviors expected and guide the type of assessments to be used to determine if the desired the level of learning has been achieved.

Institutional Learning Outcomes at Cal Poly

University Learning Outcomes (ULOs)

When students graduate from Cal Poly, they should be able to:

ULO 1. Think critically and creatively

ULO 2. Communicate effectively

ULO 3. Demonstrate expertise in a scholarly discipline and understand that discipline in relation to the larger world of the arts, sciences, and technology

ULO 4. Work productively as individuals and in groups

ULO 5. Use their knowledge and skills to make a positive contribution to society

ULO 6. Make reasoned decisions based on an understanding of ethics, a respect for diversity, and an awareness of issues related to sustainability

ULO 7. Engage in lifelong learning

Program Learning Outcomes (PLOs)

Graduates of the MS Food Science will:

PLO 1. Demonstrate technical competency in the discipline of food science
PLO 2. Design, analyze, interpret, and communicate food science research
PLO 3. Formulate solutions to practical problems in food safety, production, development, sustainability and aspects of consumer health
PLO 4. Communicate and work effectively and ethically with individuals and groups

Student Learning Outcomes (SLOs)
Graduates of the MS Food Science program will:
SLO 1. Apply fundamental principles of food science in research and required coursework
SLO 2. Formulate, design, conduct, and interpret food science research
SLO 3. Integrate theoretical food science principles and statistical design and analysis principles with practical applications to address real-world issues
SLO 4. Assess the implications of sustainability in food science
SLO 5. Effectively communicate discipline-specific information in written and oral forms to scientific and non-scientific audiences
SLO 6. Exhibit leadership and ethical reasoning

> Review of the prerequisite requirements for many of the courses, listing a concrete number of prerequisites overall to insure foundational coursework as students' progress through the program.

The only required courses which ask for prerequisites are summarized below in **Table 3.b.2**. Students should review course prerequisites carefully prior to selection of elective courses within each emphasis area as electives may require additional prerequisite course(s).

Table 3.b.2. Required courses having prerequisites others than only graduate standing

Course Name	Course Number	Prerequisites	Comments
Applied Experimental Design and Regression Models	STAT 513	Graduate status and one of the following: STAT 217, STAT 218, STAT 252, STAT 312, STAT 511, or STAT 542.	A prerequisite option is STAT 217, a course covering the basics of statistics, which most of the students might have already taken in their BS curriculum.
Advanced Food Safety	FSN 575	FSN 375 or graduate standing; and MCRO 421. Prerequisite for MCRO 421: MCRO 221 or MCRO 224. Prerequisite for MCRO 221: CHEM 110, CHEM 111, CHEM 124, CHEM 127, or PSC 102.	MCRO 221 is offered all year long and CHEM 127 is listed in our preparatory courses for the MS (See section Admission Requirements). Students could take MCRO 221 in Fall of their first year, then MCRO 421 in Fall of year 2

		Prerequisite for MCRO 224: BIO 161 and CHEM 111, CHEM 124 or CHEM 127	and FSN 575 in Winter of their 2nd year.

Assessment of Student Learning Outcomes (SLOs)

Table 4.b.1 shows how the core curriculum and other requirements for completion of the MS degree are aligned with the PLOs and SLOs for the MS degree. This table also shows whether required coursework and other required elements of the graduate program contribute to the learning outcomes at the introductory, development, or mastery level (with mastery defined here as the highest level of attainment for a master's degree student).

Assessment of learning outcomes of the MS Food Science program will include:
- direct assessment methods
- and indirect assessment methods

<u>Direct methods</u>
Performance of students will be established based on the following:
- **Performance in required and elective coursework.** Performance in each course in the Food Science MS will be based on achievement of the course learning outcomes, which directly relate to the MS Food Science program outcomes. Part of our student learning outcomes assessment will be based on assignments with a goal that 80% of Food Science MS students will meet the SLOs in all courses in the Formal Study Plan. The specified assignments are summarized in Table 4.b.2. The steps that will be implemented to evaluate assessments are: 1) instructors assign student work and, when appropriate, provide rubric(s) to students; (2) instructors collect and score assignments using rubric(s); (3) instructors summarize the data (how many "does not meet expectations", "meets expectations", and "exceeds expectations"); (4) instructors provide 2-3 representative assignments for each level of performance.
- **Rubric evaluation of written MS theses.** Conducted every year. 100% of theses will be evaluated, each by 3 faculty members, with at least 2 of them having core expertise in food science and the third member being outside the department and having expertise that can benefit the student's progress. A copy of the rubric is in **Appendix 3**. Our goal will be that at least 80% of students achieve a grade of 3 or higher (on a scale of 1-4) on all thesis-related learning outcomes. The thesis-related learning outcomes in the rubric are derived directly from the Student Learning Outcomes described earlier, although some have been broken down into multiple specific and measurable components. Students will be required to fill out this rubric evaluation and turn it in to the committee at the beginning of the oral defense. It should help the student understanding what criteria will be used to evaluate his/her work and give an opportunity for the students to reflect on the quality of their thesis.
- **Rubric evaluation of oral defense.** The written thesis rubric includes one component that will be evaluated during the oral defense. In addition, a separate rubric matrix for the oral defense will be used (**Appendix 4**). This rubric will be available for students,

staff, and faculty attending the defense and for the student's thesis committee. Similarly, our goal will be that at least 80% of students achieve a grade of 3 or higher (on a scale of 1-4) on all thesis-related learning outcomes.

Indirect methods

These assessments will gauge more complex characteristics such as those associated with longer-term determinants of success and satisfaction.

- **Exit survey and interview.** The survey will be sent electronically to every student after the MS defense and before the exit interview, and it will include perception of level of achievement of Student Learning Outcomes (see outcomes listed in section 4.a.) as well as questions about strengths and weaknesses of the MS Food Science in order to assess the effectiveness of the program and to improve the program over time. The interview will then be performed by a mediator from the Center for Teaching, Learning and Technology. Comments collected with the survey will be discussed during the exit interview. Data will be compiled and analyzed every year. Non-Cal Poly email addresses will be collected for the purpose of reaching the students for Alumni survey.
- **Alumni survey.** The survey will be conducted every 5 years, beginning the 5th year following initiation of the MS Food Science, to include graduates one year and more beyond degree completion. The survey will assess the perceived value of the MS degree for success in subsequent schooling or employment, and seek input on important strengths and weaknesses of the program in order to assess the effectiveness of the program.

Table 4.b.1. Alignment of MS Food Science required coursework and required elements of the program with Student Learning Outcomes and University Learning Outcomes

University Learning Outcomes (ULO)	Program Learning Outcomes (PLO)	Student Learning Outcomes (SLO)	Required Courses and Other Elements of MS Program									
			FSN 505 Orientation to grad research	FSN 564 (Chemistry of Food Systems)	FSN 575 (Advanced Food Safety)	SS 501 (Research Planning)	FSN 581 (Seminar – Sustainability)	FSN 599 (Thesis)	STAT 513 (Applied Experimental Design and Regression Models)	Supporting Coursework (16 units)	Thesis Oral Defense	Written Thesis
ULO 3. Demonstrate expertise in a scholarly discipline and understand that discipline in relation to the larger world of the arts, sciences, and technology	PLO 1. Demonstrate technical competency in the discipline of food science	SLO 1. Apply fundamental principles of food science in research and required coursework		D, M	D, M	D, M	D, M	D, M		D, M	M	M
		SLO 2. Demonstrate independent and creative thinking skills in the formulation, design, conduct, and interpretation of food science research.		D, M	D, M	D, M	D, M	D, M	D, M	D, M	M	M
ULO 1. Think critically and creatively	PLO 2. Design, analyze, interpret, and communicate food science research	SLO 3. Integrate theoretical food science principles and statistical design and analysis principles on practical applications to address real-world issues.		D, M	D, M		D, M	D, M		D, M		M
ULO 6. Make reasoned decisions based on an understanding of ethics, a respect for diversity, and an awareness of issues related to sustainability ULO 5. Use their knowledge and skills to make a positive contribution to society ULO 7. Engage in lifelong learning	PLO 3. Formulate solutions to practical problems in food safety, production, development, sustainability and aspects of consumer health	SLO 3. Integrate theoretical food science principles and statistical design and analysis principles with practical applications to address real-world issues. SLO 4. Assess the implications of sustainability in food science		D, M			D, M	D, M		D, M		M
ULO 2. Communicate effectively ULO 4. Work productively as individuals and in groups	PLO 4. Communicate and work effectively and ethically with individuals and in groups	SLO 5. Effectively communicate discipline-specific information in written and oral forms to scientific and non-scientific audiences.	D	D, M	D, M	D	D	D, M	D	D, M	M	M
		SLO 6. Exhibit leadership and ethical reasoning.	D				D				M	M

D = development level; M = mastery level. Introductory level is not included for all learning outcomes because of prerequisite educational background for the MS program.
Mastery is defined here as the highest level of attainment in the master's degree program.

Table 4.b.2 Comprehensive Assessment Plan MS Food Science

		Program Learning Outcomes (PLOs)				Assessment	
		PLO 1: Demonstrate technical competence in the discipline of food science	PLO 2: Apply advanced critical thinking skills in the design, analysis, interpretation and communication of food science research	PLO 3: Formulate solutions to practical problems in food production, development, sustainability and aspects of consumer health	PLO 4: Communicate and work effectively and ethically with individual or group of individuals	Frequency	How?
Student Learning Outcomes (SLOs)	SLO 1. Apply fundamental principles of food science in research and required coursework	FSN 564 Chemistry of Food Systems				Rotation for FSN 564, FSN 575	Case Study/Written Assignment/Oral presentation/Article Critics
	SLO 2. Demonstrate independent and creative thinking skills in the formulation, design, conduct, and interpretation of food science research	FSN 575 Advanced Food Safety					
	SLO 3. Integrate theoretical food science principles and statistical design and analysis principles on practical applications to address real-world issues.		FSN 599 Thesis	FSN 599 Thesis FSN 581 Graduate Seminar – Sustainability		Rotation for FSN 599, FSN 581.	Written thesis Oral thesis presentation Sustainability project
	SLO 4. Assess the implications of sustainability in food science						
	SLO 5. Effectively communicate discipline-specific information in written and oral forms to scientific and non-scientific audiences.				FSN 505 Orientation to Graduate Research FSN 564 Chemistry of Food Systems FSN 599 Thesis	Rotation for FSN 505, FSN 564. Once every two years starting in year two.	Elevator speech assignment (505), Assignment (564) Oral presentation and written thesis
	SLO 6. Exhibit Leadership and Ethical Reasoning						

[a] Inter-reliability will be addressed by having the student work normed by entire food science faculty every other year starting year 2 by evaluating work of students for each student learning outcomes. When discrepancy more than 1 point apart will occur, alignment will be achieved through consensus during a meeting involving all food science faculty.

Who will collect, analyze the data? How will data be reported? By whom?
The Food Science faculty administrating the courses will administrate the assessment, collect the data and graduate coordinator will summarize and present the data. Entire faculty will review the data and identify where improvement is needed. Assessment data will be reported to Academic Programs and Planning office by Spring quarter each year. The university Academic Assessment Council will review the reports during the summer to provide feedback on assessment activities and data. Feedback will be folded into improving assessment plans for the following year.

c) Indicate total number of units required for graduation

45 quarter units

d) Indicate any justification for any baccalaureate program that requires more than 120 – semester units of 180 quarter units. Programs proposed at more than 120 semester units will have to provide either a Title 5 justification for the higher units or a campus-approved request for an exception to the Title 5 unit limit for this kind of baccalaureate program.

(Not applicable)

e) If any formal options, concentrations, or special emphases are planned under the proposed major, identify and explain fully

(Not applicable)

f) List all requirements for graduation, including electives, for the proposed degree program, specifying course catalog numbers, course titles, total units required for completion of the degree, major requirements, electives, and prerequisites or co-requisites (ensuring that there are no "hidden" prerequisites that would drive the total units required to graduate beyond the total reported in 4c above). Include proposed catalog descriptions of all new courses.

The courses for the MS Food Science include a series of 'core' courses, which will be required for all MS Food Science students, totaling 29 units. There will be an additional 16 advisor approved units, and these course selections will be dependent on a student's research emphasis area and background. The MS is composed of a total of 45 units. There are some prerequisites for our core courses, which are summarized in **Table 4.f.1**. Regarding the advisor approved electives, because our program will accept students with different backgrounds (from food science to chemistry or engineering), students might have to take additional prerequisite courses to be able to take graduate-level Food Science courses. However, the committee of the student will carefully select these courses to make sure that the student will still graduate in a 2-year timeline. Courses for the core are listed in **Table 4.f.1**.

Table 4.f.1. Required courses for the proposed MS Food Science (29 units)

Catalog number (number of units)	Course title	Units	G or UG	Prerequisites
FSN 599 (9)	Thesis	1-9 (9 total required)	G	Graduate standing and consent of instructor
STAT 513 (4)*	Applied Experimental Design and Regression Models	4	G	Graduate standing and one of the following STAT 217, STAT 218, STAT 252, STAT 312, STAT 511, or STAT 542.
SS 501 (4)	Research Planning	4	G	Graduate standing and consent of instructor
FSN 505 (1)	Orientation to Food Science and Nutrition research	1	G	Graduate standing and consent of instructor
FSN 564 (4)	Chemistry of Food Systems	4	G	FSN 364 or graduate standing
FSN 575 (4)*	Advanced Food Safety	4	G	FSN 375 and MCRO 421, or graduate standing
FSN 581 (3)	Research Seminar	3	G	Graduate standing or consent of instructor
	Total required course units	29		

*For STAT 513 and FSN 575, see Table 3.b.2. for requirements explanation.

The required 29 units at a 500-level already fulfill the minimum 60% of graduate level courses for the MS Food Science (64.45%). There will be an additional 16 advisor approved units for the MS Food Science, and these course selections will be dependent on students' research project and background. They will be chosen according to thesis supervisor and committee recommendations, along with the graduate coordinator. One-on-one advising with the thesis supervisor will ensure appropriate alignment of student objectives with course requirements and prerequisite requirements. Most instructors of 400- and 500-level courses have historically been open to admitting graduate students on a case-by-case basis depending on background, using the "consent of instructor" criterion. Other selections of advisor approved electives may include any 400- or 500-level courses that complement the thesis research and student interest, are appropriate based on student undergraduate background and training, and are approved by the thesis committee. Students may select from any of these electives, and will have the option to select some courses from the list provided below which have been summarized according to areas of emphasis that the student might be working on.

The field of Food Science is rather broad and involves several areas of emphasis including but not limited to Microbiology/Safety; Sensory/Product Development; Sustainability; Food Chemistry; and Meat Science/Dairy Science. Each has been identified as an area of academic and professional need and growth within the broader scope of food sciences and Cal Poly has faculty with expertise in each area (see section 7). Depending on the career the MS candidate is interested in, the student will have the choice to select advisor approved elective courses. There is no one-size-fits-all 45-unit program that would be beneficial for all of our MS Food Science students. The advisor approved electives are important for the student to be successful in their specific research, and the best options depend on the research project that they are going to focus on. Students joining the program will have a variety of background and interests as the MS Food Science program welcomes students from various undergraduate programs.

Examples of advisor-approved course selections from existing courses taught at Cal Poly that would be appropriate choices for the MS Food Science degree in addition to the required courses.

Food Microbiology/Food Safety emphasis area: FSN 490 Food Safety Modernization Act: Food, FSN 491 Food Safety Modernization Act: Produce, MCRO 424 Microbial Physiology, MCRO 433 Microbial Biotechnology, MCRO 436 Environmental Microbiology

Product Development/Sensory Analysis emphasis area: FSN 508 Food Product Innovation, STAT 419 Applied Multivariate Statistics, STAT 421 Survey Sampling & Methodology, STAT 523 Design and Analysis of Experiments I

Sustainability emphasis area: BRAE 436: Food and Agricultural Process Water Engineering, BRAE 448 Bioconversion, ENVE 439 Solid Waste Management, ENVE 542 Sustainable Environmental Engineering, ENVE 450 Industrial Pollution Prevention

Food Chemistry emphasis area: CHEM 439 Instrumental Analysis, CHEM 444 Polymers & Coatings I, CHEM 458 Instrumental Organic Qualitative Analysis, CHEM 474 Protein Techniques Laboratory

Dairy Science/Meat Science: DSCI 401 Physical and Chemical Properties of Dairy Products, DSCI 402 Quality Assurance and Control of Dairy Products, DSCI 433 Dairy Plant Management and Equipment, DSCI 435 Concentration and Fractionation Technology, ASCI 415 HACCP for Meat and Poultry Operations, ASCI 425 Meat Industry Tour

Table 4.f.2. Example course of study leading to MS Food Science if student's research has an emphasis in Food Microbiology/Food Safety (45 units)

Catalog number	Course title	Units	Req'd course?	G or UG	Prerequisites
FSN 599	Thesis	1-9 (9 total required)	Y	G	Graduate standing and consent of instructor
STAT 513	Applied Experimental Design and Regression Models	4	Y	G	Graduate standing and one of the following: STAT 217, STAT 218, STAT 252, STAT 312, STAT 511, or STAT 542.
SS 501	Research Planning	4	Y	G	Graduate standing and consent of instructor
FSN 505	Orientation to Graduate Research	1	Y	G	Graduate standing and consent of instructor
FSN 564	Chemistry of Food Systems	4	Y	G	FSN 364 or graduate standing
FSN 575	Advanced Food Safety	4	Y	G	FSN 375 and MCRO 421, or graduate standing
FSN 581	Research Seminar	3	Y	G	Graduate standing or consent of instructor
Subtotal		**29 required units**			
FSN 490	Food Safety Modernization Act: Human Food	2	N	G	FSN 375 Food Safety (4 credits. Prerequisite FSN 370 (Food Plant Sanitation)), or graduate standing
FSN 491	Food Safety Modernization Act: Produce	2	N	G	FSN 375 Food Safety (4 credits. Prerequisite FSN 370 (Food Plant Sanitation)), or graduate standing
MCRO 424	Microbial Physiology	5	N	UG	MCRO 225 and CHEM 313 or CHEM 371 or graduate standing in biological sciences
MCRO 433	Microbial Biotechnology	3	N	UG	MCRO 221 or MCRO 224 and BIO 303 or BIO 351 and CHEM 216, CHEM 312 or CHEM 316 or graduate standing in biological sciences
MCRO 436	Environmental Microbiology	4	N	UG	BIO 160; BIO 161; BIO 263; and MCRO 221 or MCRO 224 or graduate standing in biological sciences
Subtotal		**16 elective units**			
Total		**45 units**			

g) List any new courses that are: (1) needed to initiate the program or (2) needed during the first two years after implementation. Include proposed catalog descriptions for new courses. For graduate program proposals, identify whether each course is a graduate or undergraduate offering.

There are no new courses that are needed to initiate the program.
No further courses are required during the first two years after implementation.
However, FSN 490 and FSN 491 are new elective courses and have been submitted for consideration for addition into the Summer 2019 catalog.

h) Attach a proposed course-offering plan for the first three years of program implementation, indicating likely faculty teaching assignments.

Table 4.h.1 shows the required course-offering plan for the first three years of program implementation, indicating likely faculty teaching assignments.

Consultation memos from involved departments (**Appendix 5)** indicate that elective and prerequisite courses for core courses (see **Table 4.f.2**) will be offered at least once every two years.

Table 4.h.1. Example of a proposed course offering plan for the MS Food Science required courses

Required Course	Year 1			Year 2			Year 3		
	Fall	Winter	Spring	Fall	Winter	Spring	Fall	Winter	Spring
FSN 505 Proposed instructor	X Jung			X Jung			X Jung		
FSN 564 Proposed instructor	X Ubbink						X Ubbink		
FSN 575 Proposed instructor		X Lathrop						X Lathrop	
FSN 581 Proposed instructor			X Jung						X Jung
FSN 599 Various faculty	X FS faculty	X FS faculty	X FS faculty	X FS faculty	X FS faculty	X FS faculty	X FS faculty	X FS faculty	X FS faculty
STAT 513		X	X		X	X		X	X
SS 501		X			X			X	

i) For master's degree proposals, include evidence that program requirements conform to the minimum requirements for the culminating experience, as specified in Section 40510 of Title 5 of the California Code of Regulations.

Per Section 40510 of Title 5 of the California Code of Regulations, satisfactory completion of a thesis (the culminating experience) will be defined as follows:

A thesis is the written product of a systematic study of a significant problem. It identifies the problem, states the major assumptions, explains the significance of the undertaking, sets forth the sources for and methods of gathering information, analyzes the data, and offers a conclusion or recommendation. The finished product will provide evidences of originality, critical and independent thinking, appropriate organization and format, and thorough documentation. An oral defense of the thesis is required. All these criteria will be evaluated with the rubric developed for the thesis evaluation (**Appendix 2**).

j) For master's degree proposals, cite the corresponding bachelor's program and specify whether it is (a) subject to accreditation and (b) currently accredited.

There are several corresponding Cal Poly bachelor's programs for the proposed MS Food Science. Most relevant is the BS Food Science, which Cal Poly currently offers. The Advanced Food Science concentration within the BS Food Science is an Institute of Food Technologist's approved program. The Applied Food Technology concentration will no longer exist in the 2019 catalog. Students with bachelor's degrees in Chemistry and Biological Sciences, along with Packaging and Engineering, may also have interest in the proposed MS Food Science. Most of these graduates would have the necessary undergraduate coursework to enter the proposed MS degree program.

Table 4.j.1. List of Cal Poly BS programs from which applicants in the MS Food Science could come from and estimated number of applicants per year

Cal Poly BS Program	Estimated number of applicants per year
BS Biochemistry	0-1
BS Biological Sciences	0-1
BS Chemistry	1-2
BS Food Science	4-5
BS Animal Science	0-1
BS Dairy Science	0-1
BS General Engineering	0-1
BS Industrial Technology and Packaging	0-1
BS Microbiology	1-2
BS Nutrition	1-2

k) Admission criteria, including prerequisite coursework.

See section 3.b.

l) Criteria for student continuation in the program.

Each quarter students are enrolled, satisfactory progress on the Formal Study Plan is expected to be made. Satisfactory academic progress shall be defined as maintaining a 3.0 graduate GPA every quarter. As indicated in the graduate education general policies, a student who is enrolled in a graduate degree program in conditionally classified or classified standing may be placed on academic probation for failure to maintain a cumulative grade point average of at least 3.0 (grade of B on a scale where A = 4.0) in all courses in the formal program of study for the degree. In addition, per University requirement, "graduate students are required to maintain continuous enrollment from the time of first enrollment in a graduate program until completion of the degree". Continuous enrollment is defined as being enrolled during Fall, Winter, and Spring quarters each year. Students can maintain continuous enrollment either by being enrolled as a regular student; obtaining approval for an education or medical leave prior to the quarter when such a leave would begin; or by registering in a special course designated for this purpose, during quarters in which they are not regularly enrolled. The special course, GS 597, is listed in the University catalog and is taken through Cal Poly Continuing Education. GS 597 is a one-unit course, at a cost of $289 per unit (as of 05/10/2017), offered credit/no credit; credits in GS 597 do not count toward meeting degree requirements. Students who fail to fulfill this continuous enrollment requirement will be not be permitted to graduate even if all degree requirements have been completed until payment has been made for all quarters of non-enrollment. In addition, all graduate students must be enrolled the quarter they graduate." (http://grad.calpoly.edu/students/continuous.html , accessed 05/10/2017)

m) For undergraduate programs, planned provisions for articulation of the proposed major with community college programs.

(Not applicable)

n) Advising "roadmaps" that have been developed for the major.

There are several important advising documents to guide candidates for the MS Food Science degree. First, the Cal Poly Graduate Education website is a valuable resource: www.grad.calpoly.edu

Second, the College of Agriculture, Food and Environmental Sciences (CAFES) provides a valuable website. http://cafes.calpoly.edu/grad-forms
This website includes important forms and details about requirements for a graduate degree including a *Path to Success* form. This document indicates the general steps for all MS candidates regardless of specific MS program.

A curriculum-specific roadmap will also be developed when students work with their thesis

committee chairs and committee members to complete the Formal Study Plans (working and final) shown on p. 6 of the CAFES Graduate Program Reference Guide (and also included in **Appendix 7** of this proposal).

The Formal Study Plan (see **Appendix 6**) is dependent on when specific courses are offered, so we will establish a regular schedule of offerings for courses required for the degree. Typically, the MS degree will be a two-year program. Several electives courses will be offered only in alternate years, at least initially. A two-year course offering plan for the required courses is shown below in **Table 4.n.1**, with "year 1" to begin when the MS Food Science is approved.

Table 4.n.1. Course offering plan for MS Food Science required coursework.

Required Course	Fall Y1	Winter Y1	Spring Y1	Fall Y2	Winter Y2	Spring Y2
FSN 505	X			X		
FSN 564	X					
FSN 575		X				
FSN 581			X			
FSN 599	X	X	X	X	X	X
STAT 513		X	X		X	X
SS 501		X			X	

Two example course plans, dependent on what year the student begins the program, are shown on the following page (**Table 4.n.2**). Note that the plans show explicitly the coursework *required* for the degree, while selections specific to the student and thesis research (and agreed upon by the thesis committee) are indicated as "approved electives."

Table 4.n.2. Two examples of the two-year curriculum "roadmap" with required coursework shown in bold.

	Course Plan for Student **Starting in Fall of Year 1** of Program		Course Plan for Student **Starting in Fall of Year 2** of Program	
Quarter	Course number/name	Units	Course number/name	Units
Fall	**FSN 505 Orientation to Graduate Research**	1	**FSN 505 Orientation to Graduate Research**	1
	FSN 564 Chemistry of Food System	4	**FSN 599 Thesis³**	2
	FSN 599 Thesis³	1		
	Approved Elective(s)¹	2-5	Approved Elective(s)¹	5-10
Winter	**SS 501 Research Planning**	4	**SS 501 Research Planning**	4
	FSN 575 Advanced Food Safety	4	**FSN 599 Thesis³**	1
	FSN 599 Thesis³	1		
	Approved Electives¹	0-3	Approved Electives¹	3-10
Spring	**STAT 513 Statistical Methods**	4	**STAT 513 Statistical Methods**	4
	FSN 599 Thesis³	1	**FSN 599 Thesis³**	1
	FSN 581³ Graduate Seminar in Food Science and Nutrition	3		
	Approved Electives¹	0-3	Approved Electives¹	3-5
Fall	**FSN 599 Thesis³**	2	**FSN 564 Chemistry of Food System**	4
			FSN 599 Thesis	2
	Approved Electives ¹	6-10	Approved Electives ¹	5-8
Winter	**FSN 599 Thesis**	2	**FSN 575 Advanced Food Safety**	4
			FSN 599 Thesis	1
	Approved Electives ¹	6-10	Approved Electives¹	5-7
Spring	**FSN 599 Thesis³**	2	**FSN 581³ Graduate Seminar in Food Science and Nutrition**	3
			FSN 599 Thesis	2
	Approved Electives¹	6-8	Approved Electives¹	3-6
	Total units	**45**	**Total units**	**45**

¹ A full-time graduate student is defined as one taking 8 or more units in a quarter. Normally students are not permitted to enroll in more than 24 units in any one quarter

² Total of 16 units must be from approved electives; quarterly units will vary by student

o) Provision for meeting accreditation requirements, if applicable, and anticipated date of accreditation request (including the WASC Substantive Change process).

(Not applicable)

5. SOCIETAL AND PUBLIC NEED FOR THE PROPOSED DEGREE MAJOR PROGRAM

a) List of other California State University campuses currently offering or projecting the proposed degree major program; list of neighboring institutions, public and private, currently offering the proposed degree major program:

Only one other CSU campus, Cal Poly Pomona, offers a graduate degree at the master's level which includes Food Science. CSU Pomona is 220 miles away from Cal Poly. UC Davis and

Chapman may have the degree programs most similar to our proposed program. The Davis and Chapman campuses are at 300 and 227 miles, respectively, from San Luis Obispo (SLO). [See **Table 5.a.1**]

Table 5.a.1. Other California universities with MS Food Science or related degree.

Location	Degree	Minimum units required	Notes on admission, thesis, project
CSU system			
Cal Poly Pomona 220 miles from SLO	MS Agriculture (Nutrition and Food Science)	45 quarter units	GPA: 3.0 minimum. GRE scores: minimum 1,000 overall, 500 in verbal, and 3.5 on the written exam. Research thesis. Non-thesis = publishable critical review paper.
UC system or Private			
UC Davis 300 miles from SLO	MS Food Science	Plan 1 (with thesis) = 30 quarter units Plan 2 (by oral examination) = 36 quarter units	Many course requirements to be accepted into the program.
Chapman 227 miles from SLO	MS Food Science	30 semester units	11-credit core, one credit for essentials in food science, three credits for research methods and 15 elective credits

Table 5.a.2 compares the Cal Poly Pomona and proposed Cal Poly San Luis Obispo MS Food Science degrees for the purpose of contrasting similar programs throughout the CSU system.

Table 5.a.2. Comparing CSU Pomona and Cal Poly SLO MS Food Science program.

	Cal Poly Pomona	Cal Poly SLO
Degree	MS Agriculture (Nutrition and Food Science)	MS Food Science (proposed)
Calendar	Quarter	Quarter
Required courses (units)	Introduction to graduate Research in the Agricultural Sciences (3)	Orientation to Graduate Research (1)
	Design and Analysis of Experimental Research I (4)	Statistical Methods (4)
	Empirical Research Methods Using Regression Analysis (3)	--
	Research Proposal (3)	Research Planning (4)
	Advanced Food Chemistry (3)	Chemistry of Food Systems (4)
	Seminar (2)	Graduate Seminar – Sustainability in Food Systems (3)
		Advanced Food Safety (4)
Total required units	18 (quarter)	20 (quarter)
Thesis units	6	9
Additional elective units	20	16
Total units for MS degree	45 quarter units	45 quarter units

b) Differences between the proposed program and programs listed in Section 5a above.

The most notable structural differences between the proposed program and CSU Pomona program listed above are 1) the requirement of a course on food safety for all the students, and 2) a component on food sustainability for all the students. The addition of these two components will graduate students with a strong food science background and an understanding of the importance of sustainability as they approach their career in food science. UC Davis is the Food Science MS program that is the closest to our program but is 300 miles from Cal Poly and primarily focuses on preparation for entry into a PhD program. Cal Poly is at a geographical advantage given its distance from the major urban areas in Northern and Southern California. Moreover, Cal Poly may act as a successful precursor (or 'feeder') MS program for PhD programs throughout the nation.

c) List of other curricula currently offered by the campus that are closely related to the proposed program.

The College of Agricultural, Food, and Environmental Sciences (CAFES) currently offers an MS degree in Agriculture with 10 different specializations, including dairy science and animal

science, and an MS in Nutrition. The current MS Food Science proposal will be offered to students wishing to focus on food science, whereas the MS Agriculture with specialization in dairy and meat science will still be available to students pursuing graduate studies in these specific fields.

d) Community participation, if any, in the planning process. This may include prospective employers of graduates.

Community participation will not be required during the planning process.

e) Applicable workforce demand projections and other relevant data.

California is the home of the largest number of food processing companies in the nation. According to a report published by the California League of Food Processors in January 2015, food and beverage processing is California's third largest manufacturing sector, responsible for a total of 760,000 jobs. The state leads the nation in production of many nut, fruit, and vegetable crops. One of the major issues confronting California and the nation is the need for a well-educated and technically trained workforce. USDA has identified Food Scientists as a priority occupation. The U.S. Bureau of Labor Statistics (BLS) projects an average growth rate change from 2014-2024 of 5% for Agricultural and Food Scientists.

Results from the 2015 Institute of Food Technologist's Employment & Salary survey give a critical assessment of the current status of the profession and reveal that the median salary for those who report a bachelor's degree as their highest level of education is $78,000. In contrast, those who earned a master's degree or a doctorate reported a median salary of $88,000 and $110,000, respectively.

Obtaining an MS Food Science through the completion of a research project and thesis, and development of critical thinking and problem-solving skills that will be part of the curriculum, will give the graduates the tools needed to be successful in their professional career journeys. The Food Science faculty at Cal Poly has expertise and conducts research in the areas in which there is a high demand for graduates. All of these areas may be a focal point for research in the proposed MS in Food Science, given the diversity of faculty (see **Appendix 8**).

In conclusion, the demand for Master's-level graduates is growing and will continue to expand in all the sectors involved in food production to food development. The proposed degree has workforce and academic demand that is projected well into the future. To support the interest of California Food Companies for graduates from our MS Food Science program, the **Table 5.c.1.** below summarizes some companies, which have expressed interest in hiring graduates from our MS Food Science program.

Table 5.e.1. Example of companies which expressed interest in hiring graduate students from the MS Food Science

Company name	Name and email of contact
American Fruits and Flavors	Nancy Zaragoza, Nancy_zaragoza@americanfruit.com
Del Monte	Jaime Reeves, Jaime.Reeves@DelMonte.com
DanoneWave	Nathalie Fontanilla, Nathalie.Fontanilla@whitewave.com
Eckert Cold Storage	Larry Rehmann, larryr@eckertcs.com
Gold Coast Ingredients	Nancy Boehm, nancy@goldcoastinc.com
Ingomar Packing Co.	Kent Rounds, kent.rounds@ingomar.com
Magnus Lyons	Kimberly Kurisu, Kkurisu@lyonsmagnus.com
Metarom (Flavor designer company)	Vincent Duprat, Vincent.duprat@metaromusa.com Christophe Dugas, Christophe.dugas@metaromusa.com
Mizkan America, Inc.	Rose Costin, rose.costin@mizkan.com
Musco Family Olive Co.	Janet Edwards, jane@olives.com
Sweet Earth Foods	Sarah Breen <sarah@sweetearthfoods.com
Seneca Food Corp.	Tim Nelson, tnelson@senecafoods.com
Sun-Maid Growers of California	Vaughn Koligian, vkoligia@sunmaid.com
White Oak Frozen Foods	Dan Wilkinson, dan.wilkinson@whiteoakfrozenfoods.com

References:
1) Sexton R.J., Medellin-Azuara J., Saitone T.L., The Economic Impact of Food and Beverage Processing in California and Its Cities and Counties, January 2015, http://clfp.com/wp-content/uploads/CLFP_FINAL_Report_1_29_15.pdf
2) Bureau of Labor Statistics, U.S. Department of Labor, *Occupational Outlook Handbook, 2016-17 Edition*, Agricultural and Food Scientists, on the Internet at https://www.bls.gov/ooh/life-physical-and-social-science/agricultural-and-food-scientists.htm# (visited *May 17, 2017*).
3) Institute of Food Technologist's http://www.ift.org/careercenter/salary-survey/2015-salary-survey-report.aspx. Visited May 12, 2017. Full report is available to IFT members and can be made available upon request.

6. STUDENT DEMAND

a) Compelling evidence of student interest in enrolling in the proposed program. Types of evidence vary and may include national, statewide, and professional employment forecasts and surveys; petitions; lists of related associate degree programs at feeder community colleges; reports from community college transfer centers; and enrollments from feeder baccalaureate programs, for example.

Evidence of student demand is highlighted below, beginning with an analysis of Cal Poly data that indicate a strong interest in the current specialization model MS. Data from the College of Agriculture, Food & Environmental Sciences at Cal Poly indicate that the currently offered MS in

Agriculture with specialization in Food Science and Nutrition was in high demand between 2008-2016, as evidenced by a 6-50% selection rate (**Table 6.a.1**).

Table 6.a.1. Data for the MS in Agriculture with specialization in Food Science and Nutrition from 2008-2016.

	Applicants	Selected	% Selected	Newly admitted	Yield
Fall 2008	14	4	28.6%	3	75.0%
Fall 2009	17	1	5.9%	1	100.0%
Fall 2010	16	6	37.5%	5	83.3%
Fall 2011	22	7	31.8%	3	42.9%
Fall 2012	27	4	14.8%	3	75.0%
Fall 2013	24	4	16.7%	4	100.0%
Fall 2014	37	9	24.4%	9	100.0%
Fall 2015	25	3	12.0%	3	100.0%
Fall 2016	18	9	50.0%	9	100.0%

To investigate student demand and value of the proposed Food Science MS, current Food Science and Nutrition students and alumni were surveyed in Spring 2017. Our goals were to 1) quantify demand for an MS, 2) determine if a preference exists for the standalone MS Food Science or the current MS Agriculture with Specialization in Food Science and Nutrition, and 3) assess the perceived value of the MS degree by respondents already in the workforce.

Fifty-eight individuals responded to the survey, and 41.2% (24 students/alumni) of those individuals were interested in obtaining a Food Science-related MS degree. Individuals that were not interested in a Food Science Master's were nutrition students interested in pursuing nutrition related graduate studies (47.3% or 27 students/alumni) or individuals that felt that this question didn't apply to them (11.3% or 7 students/alumni). **Figure 6a1** indicates that 81.8% (20 out of 24) of the students and alumni interested in pursuing a Food Science-related Master's degree prefer obtaining a standalone MS Food Science compared to the current MS specialization option. **Table 6a2** indicates the reason for selection of MS Food Science as a degree title due to its specificity for prospective employers and personal career goals. The comments clearly illustrate the potential of an MS Food Science versus an MS Agriculture, with a specialization in Food Science. How the degree will be considered by future employers is of great concern among students considering going to graduate school. By offering an MS Food Science to our students, we address their concerns.

Figure 6.a.1. Cal Poly undergraduates and alumni interest in the existing MS specialization or the standalone MS Food Science.
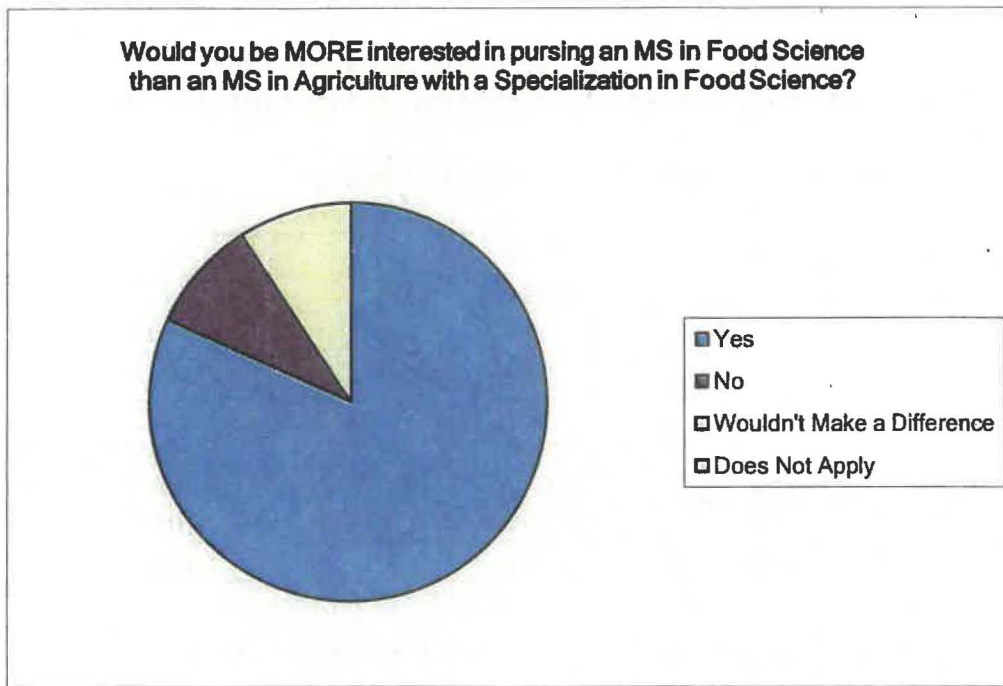

Would you be MORE interested in pursing an MS in Food Science than an MS in Agriculture with a Specialization in Food Science?

- Yes
- No
- Wouldn't Make a Difference
- Does Not Apply

Table 6.a.2. Quotes for the selection of degree title preference.

As a Master's of Science is more focused and specialized, I would want my M.S. related to food science rather than agriculture.
I currently have a PhD in Food Science. However, I believe that the specificity of MS in Food Science would greatly add value to the marketability of a Cal Poly graduate. A MS in Food Science is a very hot commodity in the food processing industry, much more so than a BS and PhD.
An MS in Food Science seems more attractive to me than an MS in Agriculture since I am already studying Food Science.
Sounds more appropriate/representative of Food Science.
I think people who want to study food science don't always have an interest in agriculture.
Even though Food Science can fall under the umbrella of agriculture, it is nicer if the degree is specified toward Food Science.
Not interested in agriculture.
Either would be great.
It seems to apply more directly to my major.

Specialization in Food Science sounds as if my coursework wouldn't be entirely food science based.
Would prefer to stay strictly in the food science realm.
More specific to goals in future.
The title seems more appropriate rather than tacked on as an aside to agriculture.
I am planning on attending graduate school; however, was not considering Cal Poly because the program did not sound applicable to what I want to do. If it were to change, I would definitely consider it.
I would want employers to see "Food Science" first rather than "Agriculture."
A MS in Food Science would be more specialized than an MS in Agriculture.

In Fall 2017, the Department started a blended program for undergraduate students in the Food Science Bachelor Degree. The blended students are taking courses that will count toward their MS degree in Agriculture with a specialization in Food Science, while still undergraduates in our Food Science Bachelor Degree. We have three Food Science undergraduate students who started the blended program in Fall 2017, and we are expecting to start 3 more in Fall 2018.

Once the MS Food Science will be in place, the blended students will be part of the MS Food Science after their change of status from undergraduate to graduate. These students will be a sustainable way to secure enough students for the MS Food Science courses.

b) Issues of diversity and access to the university considered when planning this program.

We are committed to achieving a diverse student group in the program. The field of food science in general needs a more diverse professional workforce to address important issues associated with socioeconomic characteristics, race/ethnicity, age, culture, and other factors. A growing MS program, particularly with funded research projects, offers an opportunity to recruit individuals who might not have been attracted to the undergraduate experience at Cal Poly. Additionally, there are several globally relevant themes that students may pursue in the MS, which may draw on an international graduate student network.

Because the proposed program is a thesis research-based MS program, issues of access for non-traditional students cannot be solved via a distance MS program approach, as students will need access to campus facilities for research project work. However, as it has been done over the years with some students in the MS Agriculture (Specialization in Food Science & Nutrition), we will accommodate, when possible, within the timeframe of grant funding, non-traditional students such as those in the workforce, who may take a longer path to completion of the MS.

c) For master's degree proposals, the number of declared undergraduate majors and the degree production over the preceding three years for the corresponding baccalaureate program, if there is one.

The numbers in the table below are for enrollees and graduates from the BS Food Science program at Cal Poly. Note, however, that the MS Food Science program is expected to draw from other majors as well (e.g., Chemistry, Biological Sciences), both on campus and from other universities (section 6B above).

Cal Poly's goal numbers for stable enrollment in the Food Science major are 60 majors and about 40 graduates per year.

Year	Total enrolled in undergraduate Food Science major (Fall quarter census)	Total degrees awarded in same AY, BS Food Science
2012-13	42	39
2013-14	73	50
2014-15	68	33
2015-16	69	30
2016-17	53	44

d) Professional uses of the proposed degree program.

Numerous opportunities exist for professional uses of the proposed degree program. The principle anticipated jobs and career paths are listed below:

- Governmental jobs
    - Local, state and federal opportunities
        - USDA
        - FDA
- Foodservice & Management
    - Schools
    - Hospitals
    - Other institutional entities
- Food Industry
    - Research Scientist
    - Product development
    - Sensory evaluation
    - Food analyst
    - Food microbiologist
    - Food processing plant manager
    - Nutrition labeling and regulatory affairs
    - Product claims validation and research
    - Food fermentation
    - Brewing and distilling

- Postsecondary Educators
  - o Junior colleges
  - o Lecturers at universities
- MS as preparation for PhD in a broad range of areas

e) The expected number of majors in the year of initiation and three years and five years thereafter. The expected number of graduates in the year of initiation, three years, and five years thereafter.

This information is contained within the table below:

		Number of Students	
	At initiation	3 years after initiation	5 years after initiation
Number of Majors	4	8-10	10-12
Number of Graduates	0	4-6	12

7. EXISTING SUPPORT RESOURCES FOR THE PROPOSED DEGREE PROGRAM

a) Faculty who would teach in the program, indicating rank, appointment status, highest degree earned, date and field of highest degree, professional experience, and affiliations with other campus programs. For master's degrees, include faculty publications or curriculum vitae.

A list of faculty and research interests appears in **Table 7.a.1**. In the FSN Department, 8 full-time faculty with terminal degrees may lead courses in the proposed MS.

The CVs of faculty who appear in the list appear in **Appendix 8** in alphabetical order.

Table 7.a.1. Faculty, rank and research areas of those participating in the planning of the graduate group in Food Science.

Department	Faculty	Rank	Area of Expertise
Food Science and Nutrition	Dr. Amanda Lathrop	Associate Professor	Microbiology/Food Safety
	Dr. Samir Amin	Associate Professor	Product Development/Culinary
	Dr. Luis Castro	Assistant Professor	Chemistry
	Dr. Amy Lammert	Associate Professor	Sensory/Product Development
	Dr. Stephanie Jung	Professor	Processing/Engineering/Chemistry/ Sustainability
	Dr. Gour Choudhury	Professor	Engineering
	Dr. Robert Kravets	Associate Professor	Processing
	Dr. Job Ubbink	Professor	Food Physical Chemistry & Food Functionality

b) Space and facilities that would be used in support of the proposed program. Existing academic technology, equipment, and other specialized materials currently available.

FSN is the administrative home of the MS Food Science, so the main focus will be on FSN facilities/equipment relevant for food science research projects. Building 24, the Food Processing Building, houses classrooms and laboratories devoted to FSN programs. **Appendix 9** shows the floor plan of building 24. The spaces of primary relevance to food science graduate research are the chemistry-style laboratory (room 104, a 25-station wet chemistry-style teaching lab) and an adjacent small special projects lab (room 104C). Room 104F is a graduate student space with desks and computers. There are several faculty offices in building 24, and there are two classrooms (rooms 113 and 103A) often used in conjunction with laboratory space. The culinary lab/kitchen (room 103) may also have some use in select food science research projects. The students will have access to the Food Processing Pilot Plant (room 106 and numerous ancillary rooms), Food Safety pathogen lab (room 104B), space being devoted to food production/processing/sensory analysis (room 107), and ancillary rooms.

Appendix 9 summarizes current FSN facilities and equipment located in building 24. In addition to facilities and equipment in FSN, students (depending on thesis committee membership and thesis research topic) may have access to other facilities and equipment across campus. **Appendix 9** also summarizes current facilities and equipment in the Dairy Products Technology Center of the Dairy Science Department and the Animal Science Department.

In addition to the items mentioned in section 7b, other resources include computer laboratories and classrooms across campus.

The College is also planning on building a 75,567 square-foot state-of-the art facility, the "Frost/Boswell building". This building is expected to be started in the next couple of years, and it is expected that it can be used for research within 5 years. This building will have 6 laboratories for the FSN programs, including a culinary laboratory, a product development laboratory, a sensory laboratory, a food analysis laboratory, and a food safety laboratory. A description of this building is available in **Appendix 9**.

The FSN department also has two key individuals that contribute to the successful use of the building 24 facility: Molly Lear, FSN Operations Manager, MPP, and Dwayne Jones, Equipment Technician III – Electro-Mechanical.

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c) A report provided by the campus Library, detailing resources available to support the program (discussion of subject areas, volume counts, periodical holdings, etc. are appropriate).

Please refer to **Appendix 10** for this report.

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8. ADDITIONAL SUPPORT RESOURCES REQUIRED

a) Any special characteristics of the additional faculty or staff support positions needed to implement the proposed program.

There will be no additional faculty or staff support positions needed to implement the proposed program, except replacement of faculty recently retired or lost.

b) The amount of additional lecture and/or laboratory space required to initiate and to sustain the program over the next five years. Indicate any additional special facilities that will be required. If the space is under construction, what is the projected occupancy date? If the space is planned, indicate campus-wide priority of the facility, capital outlay program priority, and projected date of occupancy.

There will be no additional lecture and/or laboratory space required to initiate the proposed program.

Over the next five years, there will be no anticipated major space or facilities that will be required. The additional classes in the MS program will be offered as part of the general class offerings. As with any course offering, 'smart' classrooms will be used. Classrooms have been at a premium on campus but the MS program will be able to use smaller classrooms because the estimated class size of any class would be between 10-20 students. In addition, the FSN department has a room for meetings, a graduate students' room equipped with computers and printers, as well as classrooms. With the completion of the new Frost/Boswell science building on the Cal Poly campus, more classrooms will become available over the next five years along with research facility.

c) A report written in consultation with the campus librarian, indicating any additional library resources needed. Indicate the commitment of the campus either to purchase or borrow through interlibrary loan these additional resources.

Please refer to **Appendix 10** for this report.

d) Additional academic technology, equipment, or specialized materials that will be (1) needed to implement the program and (2) needed during the first two years after initiation. Indicate the source of funds and priority to secure these resource needs.

(1) There will be no additional academic technology, equipment, or specialized materials required to initiate the proposed program.

(2) Aside from the conventional technology upgrades, administration considerations, and similar small-scale requirements, there will be no additional academic technology, equipment, or specialized materials required to continue the proposed program after two years. These upgrades will be comprised of input from the department and the college. The increased number of graduate students in the department will offset these relatively minimal costs.

College of Agriculture, Food and Environmental Sciences
Dean's Office

CAL POLY

Date: April 25, 2018

To: Brian Self, Chair
Academic Senate Curriculum Committee

CC: Michael McCullough, Chair, CAFES Curriculum Committee
Richard Savage, Dean, Graduate Education
Job Ubbink, Head, Food Science and Nutrition Department
Stephanie Jung, Food Science and Nutrition Department

From: Jim Prince, Associate Dean for Research and Graduate Programs
College of Agriculture, Food, and Environmental Sciences

Re: New program: Master of Science in Food Science

The CAFES Dean's Office strongly supports the proposal from the faculty of the Food Science
and Nutrition Department for a new Master of Science in Food Science program. The program
is thoughtfully constructed and does not involve the allocation of significant additional
resources. It has been carefully vetted by both the departmental curriculum committee and
the CAFES Curriculum Committee, and the faculty have incorporated feedback from Graduate
Education and Academic Programs.

This program will replace the current Master of Science in Agriculture with a specialization in
Food Science (and Nutrition).

State of California

CAL POLY
SAN LUIS OBISPO

Memorandum

Date: April 11, 2018

To: Brian Self, Chair Academic Senate Curriculum Committee

Copy: Richard Savage, Dean, Graduate Education
           Susan Olivas, Office of the Registrar

From: Michael McCullough, Chair
           CAFES Curriculum Committee

Subject: Submission of 2019-21 Catalog Proposals

The CAFES Curriculum committee has finished reviewing the proposal for the new Master of Science in Food Science. The committee unanimously voted to approve the proposal on April 6, 2018. This memo serves as notification, so the Academic Senate curriculum committee may begin their review.

CAL POLY

California Polytechnic State University
San Luis Obispo, CA 93407-0255
Animal Science Department
(805) 756-2419

Dr. Stephanie Jung
Graduate Coordinator
Food Science and Nutrition Department
California Polytechnic State University

June 7, 2017

Re: Letter of support for MS Food Science proposal by the Food Science and
Nutrition Department at California Polytechnic State University

Dr. Jung,

I am pleased to write this letter supporting the initiative of the Food Science and
Nutrition Department in proposing a new MS degree in Food Science. There is
clearly a need for this new degree, which will supersede the existing MS in
Agriculture with a specialization in Food Science.

As the Animal Science Department Head, I look forward to continually working
with the Food Science and Nutrition Department in identifying undergraduate
students who are interested in the field of Food Science. Several of my faculty
members collaborate with faculty from Food Science and Nutrition Department, as
member of MS candidate's evaluation committee.

The field of Food Science fosters interdisciplinary collaboration and allows
faculty from other departments to work collaboratively with faculty and be
involved in thesis projects of MS Food Science students. This multidisciplinary
approach attracts more students from a diverse array of backgrounds, bring
faculty researchers together in mentoring students, and build Cal Poly's research
portfolio.

Consequently, I am pleased to support the MS Food Science proposal and I am
looking forward for a continued collaboration with the faculty of the Food Science
and Nutrition department.

Sincerely,

Jaymie Noland, DVM
Department Head
Animal Science
California Polytechnic State
University
1 Grand Ave,
San Luis Obispo, CA 93407

The California State University - Bakersfield • Channel Islands • Chico • Dominguez Hills • Fresno • Fullerton • Hayward • Humboldt • Long Beach • Los Angeles • Maritime Academy • Monterey Bay • Northridge • Pomona • Sacramento • San Bernardino • San Diego • San Francisco • San Jose • San Luis Obispo • San Marcos • Sonoma • Stanislaus

CAL POLY ORFALEA COLLEGE OF BUSINESS
Industrial Technology and Packaging

Dr. Stephanie Jung
Graduate Coordinator
Food Science and Nutrition Department
California Polytechnic State University

18Apr17

Re: Letter of support for MS Food Science proposal by the Food Science and Nutrition Department at California Polytechnic State University

Dr. Jung,

I am pleased to write this letter supporting the initiative of the Food Science and Nutrition department in proposing a new MS degree in Food Science. There is clearly a need for this new degree, which will supersede the existing MS in Agriculture with a specialization in Food Science.

As area chair of **Industrial Technology and Packaging**, I look forward to continue working with the Food Science and Nutrition department in identifying undergraduate students who are interested in the field of Food Science. Several of my faculty members already collaborate with faculty from Food Science and Nutrition department, as member of MS candidate's evaluation committee.

The field of Food Science fosters interdisciplinary collaboration and allows faculty from other departments to work collaboratively with faculty and be involved in thesis projects of MS Food Science students. This multidisciplinary approach attracts more students from a diverse array of backgrounds, bring faculty researchers together in mentoring students, and build Cal Poly's research portfolio. Our Packaging program and new MS in Packaging Value Chain will have a special affinity for the new masters.

Consequently, I am pleased to support the MS Food Science proposal and I am looking forward for a continued collaboration with the faculty of the Food Science and Nutrition department.

Respectfully yours,

Eric Olsen, PhD
Area Chair - Industrial Technology and Packaging | Cal Poly - Orfalea College of Business
03-405 | 1 Grand Ave, San Luis Obispo, CA 93407 | 805 756-1754 | cell 805 602-0228
eolsen@calpoly.edu | webpage: http://www.cob.calpoly.edu/directory/profile/eric-olsen/

ITP Values: Honesty, Respect, Responsibility, Fairness, Compassion, and Safety

CENTRAL COAST LEAN

CAL POLY

LETTER OF SUPPORT

TO:	Dr. Stephanie Jung	DATE:	4/20/2017
	Graduate Coordinator		
	Food Science and Nutrition		
	Department		
	California Polytechnic State University		

FROM: Benoît LECAT
Wine and Viticulture Department
Head

SUBJECT: Letter of support for MS Food Science proposal by the Food Science and Nutrition
Department at California Polytechnic State University

Dear Colleague,

I am pleased to write this letter supporting the initiative of the Food Science and Nutrition department in proposing a new MS degree in Food Science. There is clearly a need for this new degree, which will supersede the existing MS in Agriculture with a specialization in Food Science.

As department head in Wine and Viticulture, I look forward to continue working with the Food Science and Nutrition department in identifying undergraduate students who are interested in the field of Food Science. Several of my faculty members already collaborate with faculty from Food Science and Nutrition department, as member of MS candidate's evaluation committee, especially my colleagues in enology.

The field of Food Science fosters interdisciplinary collaboration and allows faculty from other departments to work collaboratively with faculty and be involved in thesis projects of MS Food Science students. This multidisciplinary approach attracts more students from a diverse array of backgrounds, bring faculty researchers together in mentoring students, and build Cal Poly's research portfolio. This Master program is an opportunity for the Wine and Viticulture Faculty to supervise graduate students given we don't have any master in our own field.

Consequently, I am pleased to support the MS Food Science proposal and I am looking forward for a continued collaboration with the faculty of the Food Science and Nutrition department.

Yours respectfully,

Benoit Lecat, PhD
Wine and Viticulture Department Head- Cal Poly - San Luis Obispo
E-mail: blecat@calpoly.edu
Phone: +1 (805) 756-2415

California League of Food Processors
2485 Natomas Park Drive, Suite 550 | Sacramento, CA | 95833
P: (916) 640-8150 | F: (916) 640-8156 | www.clfp.com

April 27, 2017

Stephanie Jung, PhD
Graduate Program Coordinator
Department of Food Science and Nutrition
California Polytechnic State University
San Luis Obispo, CA 93407

Re: Letter of support for MS Food Science program developed by the Food Science and Nutrition Department at California Polytechnic State University

Dear Dr. Jung

The California League of Food Processors (CLFP) would like to express its support for efforts of the Food Science and Nutrition department and faculty in developing a focused MS degree in Food Science. There is clearly a need for this new degree, which will supersede the existing MS in Agriculture with a specialization in Food Science.

There are currently over 3,000 food processing firms in California and the industry continues to expand to meet consumer demand for more and different products. To maintain this growth the industry needs trained food scientists, but currently the number of university graduates is not keeping pace with demand, especially with respect to students with graduate degrees. Industry needs staff with the technical skills required to develop new products, manage food safety programs, and conduct quality assurance tests.

The food science program at Cal Poly San Luis Obispo is outstanding and the university's philosophy of "learning by doing" assures that graduates are prepared to contribute from their first day on the job. The faculty have an exceptional commitment to ensuring that the students have the necessary training and skills to be successful. Due to the quality of the program I have no doubt that there will be many students interested in the new MS degree and that the graduates will have no problems finding employment. Only two other universities in California offer an MS degree in food science, so there clearly is a need for Cal Poly to expand its program offerings.

CLFP strongly supports the focused MS degree program in Food Science and our membership looks forward to working with the Cal Poly Food Science and Nutrition Faculty in shaping the future of California's food processing industry.

Sincerely,

Rob Neenan
President/CEO

From: **Brian P. Self** <bself@calpoly.edu>
Date: Sat, May 5, 2018 at 2:13 PM
Subject: MS Food Science Proposal
To: "Mary E. Pedersen" <mpederse@calpoly.edu>, "Richard N. Savage" <rsavage@calpoly.edu>
Cc: "Michael P. McCullough" <mpmccull@calpoly.edu>, Susan Olivas <solivas@calpoly.edu>,
Dustin Stegner <pstegner@calpoly.edu>

Greetings-

The ASCC has reviewed and approved the attached proposal for the Master of Food Science.

Brian Self

Brian P. Self, PhD
Chair, Academic Senate Curriculum Committee
Professor of Mechanical Engineering
California Polytechnic State University
San Luis Obispo, CA 93407-0001
805-756-7993
Spring Office Hours
M 3-4pm, W 230-330pm, Th 10-11am
Sunday online, 9-10pm

Adopted:

ACADEMIC SENATE
Of
CALIFORNIA POLYTECHNIC STATE UNIVERSITY
San Luis Obispo, CA

AS-___-18

RESOLUTION ON PROPOSED NEW DEGREE PROGRAM: MASTER OF SCIENCE IN ENVIRONMENTAL SCIENCES AND MANAGEMENT

1 2 3 4	WHEREAS,	The Department of Natural Resources Management and Environmental Science has a history of preparing Master students for careers in natural resource management and environmental sciences; and
5 6 7 8 9 10 11 12	WHEREAS,	The purpose of the proposed Master of Science in Environmental Sciences and Management is to provide graduate students with the knowledge, advanced critical thinking, skills, ethics, and experiences to address current and future environmental problems, and to meet workforce demands in a growing field that addresses major environmental challenges such as global climate change, air and water pollution, depletion and degradation of natural resources, and population growth; and
13 14 15 16 17	WHEREAS,	The faculty in the Natural Resources Management and Environmental Science Department have the expertise to deliver a Master of Science in Environmental Sciences and Management with a focus on environmental sustainability, broadly defined; and
18 19 20 21 22	WHEREAS,	There is substantial interest by California Polytechnic, nation, and international students who desire the opportunity to pursue their education with a Master of Science in Environmental Sciences and Management as a pathway to an environmental career; and
23 24 25 26	WHEREAS,	The program is distinctive within the CSU and UC systems in requiring the integration of environmental science knowledge with applied environmental management; and
27 28 29 30 31	WHEREAS,	Cal Poly graduates with a Master of Science in Environmental Sciences and Management can assist the state of California in addressing major environmental Concerns such as water quality and supply, forest health, energy supply, and conservation of biodiversity; therefore be it
32 33	RESOLVED:	That the proposed new degree program for the Master of Science in Environmental Sciences and Management be approve.

Proposed by: Greg Brown, Professor, on behalf of the Natural Resources Management and Environmental Sciences Faculty

Date: May 22, 2018

CAL POLY

SAN LUIS OBISPO

DRAFT v. 1.3

New Degree Program
Master of Science
in Environmental Sciences and Management

(replaces MS Forestry Sciences and
MS Agriculture with a Specialization in Soil Science)

College of Agriculture, Food, and Environmental Sciences (CAFES)

May 18, 2018

Submitted by
Greg Brown, Professor, Department of Natural Resources Management and Environmental Sciences
Chris Surfleet, Associate Professor, Department of Natural Resources Management and Environmental Sciences
Christopher Appel, Professor, Department of Natural Resources Management and Environmental Sciences

CSU Degree Program Proposal Template
Revised November 2016

Please confirm (√) that the following are included in the degree proposal:

✓ **Board of Trustees Academic Master Plan approval date.** (March 2017)

✓ **Title 5 minimum requirements for proposed master's degree have been met, including:**

    ✓ *minimum of 30 semester (45 quarter) units of approved graduate work*

    ✓ *no more than 50% of required units are organized primarily for undergraduate students*

    ✓ *maximum of 6 semester units (9 quarter units) are allowed for thesis or project*

CSU DEGREE PROPOSAL
Faculty Check List

1. *PROGRAM TYPE*

   a. State-Support
   b. Delivery Type: Fully face to face
   c. New Program

2. *PROGRAM IDENTIFICATION*

   a. **Campus**
   California Polytechnic State University, San Luis Obispo

   b. **Full and exact degree designation and title**
   Master of Science in Environmental Sciences and Management

   c. **Date the Board of Trustees approved adding this program projection to the campus Academic Master Plan**
   March 2017

   d. **Term and academic year of intended implementation (e.g., fall 2018)**
   Fall 2019

   e. **Total number of units required for graduation. This will include all requirements (and campus-specific graduation requirements), not just major requirements.**
   45 quarter units

   f. **Name of the department(s), division, or other unit of the campus that would offer the proposed degree major program. Please identify the unit that will have primary responsibility.**
   Department of Natural Resources Management and Environmental Sciences, College of Agriculture, Food, and Environmental Sciences

   g. **Name, title, and rank of the individual(s) primarily responsible for drafting the proposed degree major program.**
   Dr. Greg Brown, Professor, Environmental Management (ggbrown@calpoly.edu)
   Dr. Chris Surfleet, Assoc. Professor, Environmental Sciences (csurflee@calpoly.edu)

   h. **Statement from the appropriate campus administrative authority that the addition of this program supports the campus mission and will not impede the successful operation and growth of existing academic programs.**
   Support Letter from Mary Pedersen, Senior Vice Provost Academic Programs and Planning (Appendix 1.1)

3

i. *Any other campus approval documents that may apply (e.g. curriculum committee approvals).*
   - Approval Letter from Jeffrey D. Armstrong, President (Appendix 1.2) including the approval of Master of Science Degree, Academic Senate Resolution xxxxx
   - Letter from Jim Prince, CAFES Associate Dean of Research and Graduate Programs, CAFES (Appendix 1.3)
   - Letter from Michael McCullough, Chair CAFES Curriculum Committee (Appendix 1.4)
   - Report from Katherine O'Clair, College Librarian for CAFES (Appendix 1.5)

j. *Please specify whether this proposed program is subject to WASC Substantive Change review. The campus may submit a copy of the WASC Sub-Change proposal in lieu of this CSU proposal format. If campuses choose to submit the WASC Substantive Change Proposal, they will also be required to submit a program assessment plan using the format found in the CSU program proposal template.*

   N/A

k. *Optional: Proposed Classification of Instructional Programs and CSU Degree Program Code*
   Master of Science in Environmental Sciences and Management
   CSU Degree Program Code 49011
   CIP Code 03.0104

3. PROGRAM OVERVIEW AND RATIONALE

a. *Provide a brief descriptive overview of the program citing its purpose, and strengths, fit with the institutional mission or institutional learning outcomes, and compelling reasons for offering the program at this time.*

   1. Purpose and strengths.
   The purpose of the Masters of Science in Environmental Sciences and Management program is to provide advanced education and training in a growing field with strong career opportunities and to provide an advanced degree option for students graduating from Cal Poly with continuing educational interests in environmental studies. The occupational outlook for environmental scientists and specialists published by the Bureau of Labor Statistics projects employment growth of 11 percent from 2016 to 2026, faster than the average for all occupations. Heightened public interest in the environment, as well as increasing demands placed on the environment by population growth, are expected to spur demand for environmental scientists and specialists.

   The strengths of the program: (1) provides core knowledge in research skills and scientific literacy; (2) provides core knowledge in both environmental sciences and environmental management; (3) is multidisciplinary and allows students to specialize in an environmental science or management sub-discipline through choice of electives, (4) is flexible, providing options for student to apply their knowledge through both a traditional thesis or a professional project.

4

2. *Fit with the institutional mission.*

> **Our Mission:** *Cal Poly fosters teaching, scholarship, and service in a Learn by Doing environment in which students, staff, and faculty are partners in discovery. As a polytechnic university, Cal Poly promotes the application of theory to practice. As a comprehensive institution, Cal Poly provides a balanced education in the arts, sciences, and technology, while encouraging cross-disciplinary and co-curricular experiences. As an academic community, Cal Poly values free inquiry, cultural and intellectual diversity, mutual respect, civic engagement, and social and environmental responsibility.*

The proposed MS in Environmental Sciences and Management degree program *fits Cal Poly's mission* because it will provide students the opportunity to partner with other students, staff, faculty, industry, and government to apply environmental science and management principles to advance environmental knowledge, theory, and practice. Successful graduates will acquire a comprehensive education in research methods, environmental science, and environmental management.

The vision for the Natural Resources Management & Environmental Sciences Department (NRES) is to be one of the premier educational and applied research programs in Natural Resources Management and Environmental Sciences in the Western United States (approved by faculty vote, April 16, 2013). The mission of the NRES Department is to graduate passionate, ethical leaders in the science and sustainable management of natural resources and the environment using a "Learn by Doing" approach (approved by faculty vote, September 11, 2012). The new MS degree program is consistent with this vision, mission, and the NRES strategic plan (adopted July 30, 2013) which calls for improvements to the graduate program.

3. *Reasons for offering the program at this time.*
On a global scale, the world is confronted with major environmental challenges such as global climate change, air and water pollution, depletion and degradation of natural resources, and population growth. Within the state of California, major environmental concerns include water quality and supply, forest health, energy supply, endangered species, and population growth. There is a critical need to provide advanced education opportunities to future environmental professionals to research and find solutions to these environmental challenges.

At Cal Poly, our undergraduate curriculum currently supports three sub-disciplines (majors) in the environmental sciences: Forestry & Natural Resources, Environmental Earth & Soil Sciences, and Environmental Management and Protection. Our current Master's programs (MS in Forestry Sciences and MS in Agriculture with a specialization in Soil Science) do not support all of these sub-disciplines which limits our ability to recruit and accept students with educational interests in Environmental Management and Protection, our largest undergraduate major (~350 students). The new MS degree would build on Department strengths that reflect the strong linkage between environmental science knowledge and management of the environment, while maintaining sub-discipline graduate studies in forestry sciences, earth sciences, and soil sciences.

Provide the proposed catalog description. The description should include:

1. A narrative description of the program

The Master of Science in Environmental Sciences and Management degree is an interdisciplinary degree designed to provide core knowledge in research methods and planning, environmental science, and environmental management, while providing for sub-disciplinary environmental specialization through directed electives. Primary topics of sub-disciplinary studies are environmental management, forestry science, earth science, and soil science. The program prepares students for a broad range of careers in science, research, and environmental management.

The program is open to students from any undergraduate major who have demonstrated high academic achievement. The program requires completion of a core curriculum (research skills, sciences, management) and directed electives for a total of 45 units. Students admitted to the program are expected to begin their studies in the fall quarter as a cohort, but students with prerequisite coursework deficiencies may be admitted in other quarters.

2. Admission requirements

Admission requirements for this program require that students have at least a 3.0 GPA in the final 90 quarter units of their undergraduate degree. Students must take the GRE exam and have at least 3 letters of reference. All other requirements for admission to Cal Poly apply.

3. A list of all required courses for graduation including electives, specifying course catalog numbers, course titles, prerequisites or co-requisites (ensuring there are no "hidden prerequisites" that would drive the total units required to graduate beyond the total reported in 2e above), course unit requirements, and any units associated with demonstration of proficiency.

Catalog number	Course title	Units	Prerequisites
Research skills core			
ESCI 501	Research Planning	4	Graduate standing or consent of instructor
ESCI 502	Research Methods and Data Analysis	4	Graduate standing or consent of instructor
ESCI 581	Graduate Seminar in Environmental Sciences	2	Graduate standing or consent of instructor
ESCI 599	Thesis	9	
or	or	or	
ESCI 596 + 500 level course	Professional project	5 + 4	
Environmental Sciences core			
ESCI 550	Advanced Environmental Sciences	4	Graduate standing or consent of instructor
Environmental Management core			
ESCI 590	Advanced Environmental Management	4	Graduate standing or consent of instructor
Total required coursework		27	
Directed electives (must be 400 or 500 level)*		18	

Total units   45
---

*Elective course selections will depend on students' interests and sub-discipline emphasis. Students in the research thesis option will consult with their research supervisor to ensure appropriate alignment of student learning objectives with selected courses. Students in the professional project option will consult with the graduate program coordinator for the selection of electives.

The following courses at Cal Poly are indicative of potential electives for students with interests in the following areas:

Environmental soil science: SS 421, SS 422, SS 423, SS 431, SS 432, SS 440, SS 442, SS522
Environmental policy and management: NR 404, NR 408, BIO446, CM425, GSE 532
Environmental planning: NR 416, NR 425, NR 455, CRP 420, CRP 440, CRP 545
Forestry and natural resources: NR 402, NR 414, NR 420, NR 475, NR 503
Geospatial technology: NR418, EE 424, GEOG 440, CRP 457, SS 582, CE 536
Sustainable agriculture: EDES 406, CRP 504, AEPS 445

c. *Total units required to complete the degree:* 45 quarter units

d. *If a master's degree, catalog copy describing the culminating experience requirement(s)*

The degree culminates in completion of a *thesis* or *professional project*. The thesis option is for students interested in advanced graduate coursework and experience in completing an original research project. The findings of this thesis should be publishable in a peer-reviewed scientific journal. The project option is for students interested in pursuing a professional, non-research project, often working with or for an environmental agency or organization.

1. CURRICULUM

a. *These program proposal elements are required:*

- *Institutional Learning Outcomes (ILOs)*
- *Program Learning Outcomes (PLOs)*
- *Student Learning Outcomes (SLOs)*

Institutional Learning Outcomes
When students graduate from Cal Poly, they should be able to:

1. Think critically and creatively
2. Communicate effectively
3. Demonstrate expertise in a scholarly discipline and understand that discipline in relation to the larger world of the arts, sciences, and technology
4. Work productively as individuals and in groups
5. Use their knowledge and skills to make a positive contribution to society

6. Make reasoned decisions based on an understanding of ethics, a respect for diversity, and an awareness of issues related to sustainability
7. Engage in lifelong learning

Program Learning Outcomes (PLOs)

Graduates of the MS in Environmental Science and Management will be able to:

1. Apply appropriate research methods for data collection, analyses, and communication of environmental science and management problems. (Bloom's taxonomy—knowledge, comprehension, application)
2. Analyze a research problem or objective/hypothesis (knowledge gap) and develop a research plan to address the problem or objective/hypothesis (Bloom's taxonomy: analysis and application)
3. Execute a research plan (research design, data collection, analyses, and communication) or professional project plan to completion (Bloom's taxonomy: application and creation).
4. Communicate research or professional project outcomes effectively using oral, written and digital media communication appropriate for the discipline (Bloom's taxonomy: synthesis)
5. Synthesize and communicate core knowledge content contained within at least one environmental science sub-discipline (Bloom's taxonomy: synthesis and evaluation)
6. Apply scientific knowledge to the management of environmental problems (Bloom's taxonomy: application, evaluation and synthesis)
7. Demonstrate ethical reasoning and choose an appropriate course of action based on ethical standards in the research discipline and the research process in general, including publication and intellectual property (Bloom's taxonomy: evaluation and application).
8. Analyze, interpret and explain how environmental, economic, and social systems interact to promote the sustainable management of environmental and natural resources. (Bloom's taxonomy—comprehension, analysis, synthesis)

Student Learning Outcomes (SLOs)

Students who successfully complete the MS in Environmental Sciences and Management will be able to:

1. Evaluate theory and critique research and defend a position.
2. Design and critique a scientific experiment using steps in the scientific method.
3. Test hypotheses and draw correct inferences using both quantitative and qualitative analysis.
4. Analyze and evaluate multiple perspectives and interpretations associated with various environmental and social science theories and defend or refute their merits.
5. Research, design, develop, and implement a capstone research study or professional project that solves a scientific problem or affects positive organizational and/or social change.

b. ***These program proposal elements are required:***

- *Comprehensive assessment plan addressing all assessment elements*
  (See Appendix 2)
- *Curriculum map matrix indicating where student learning outcomes are introduced (I), developed (D), and mastered (M).*
  (See Appendix 3)

The NRES Department has a standing Assessment Committee that will evaluate MS program assessment elements identified in the comprehensive assessment plan. The Assessment Committee will summarize its assessment activities at the end of each academic year and will then report the results to the full NRES Department faculty. More specifically, four PLOS will be assessed each year on a rotating cycle for a complete two-year cycle. Following the two-year cycle, the assessment results will be compiled in preparation for program review and self-study.

The Assessment Committee will make recommendations on how the degree program can be improved based on the assessment results. The Department will decide upon and perform additional curricular follow-ups to all assessment activities, which may involve consultation with external bodies.

Direct Assessment
The types of artifacts that will be used to collect direct assessment include:

Embedded questions in exams linked to specific SLOs/PLOs

Projects, term papers, oral presentations, lab reports, and field experience. We will use rubrics developed around certain criteria for specific learning outcome to be assessed. Each course will have artifacts linked to SLOs and PLOs.

Capstone Experience: Thesis Project or Professional Project
Progress through the MS degree provides a cumulative experience beginning with foundational coursework in research methods, environmental science, and environmental management, and culminating with implementation of a research thesis or professional project. Students can experience this milestone through completion of the research thesis course (ESCI 599) or the professional project course (ESCI 596). In both cases, written reports will be evaluated using an appropriate rubric to assess many of the PLOs.

The comprehensive assessment plan provides a structure to evaluate achievement of PLOs. The assessment plan aligns the University Learning Outcomes, and the Program Learning Outcomes with the assessment activities, tools, schedule, reports, program findings and closing the loop strategies for program assessment and improvement.

Indirect Assessment
The following methods will be used to collect data that reflects indirect assessment:

Surveys/Interviews:
The MS degree program will survey graduating students and alumni to gather data and feedback for assessment of program objectives.

Graduate Status Report:
External indicators can serve as excellent feedback that the MS degree is meeting its program goals. The Graduate Status reports will help determine the success of graduates in securing positions in the private sector, governmental agencies, and non-profits.

c. *Indicate total number of units required for graduation.*
45 quarter units

d. *Include a justification for any baccalaureate program that requires more than 120-semester units or 180-quarter units. Programs proposed at more than 120 semester units will have to provide either a Title 5 justification for the higher units or a campus-approved request for an exception to the Title 5 unit limit for this kind of baccalaureate program.*

Not applicable for an MS Program.

e. *If any formal options, concentrations, or special emphases are planned under the proposed major, identify and list the required courses. Optional: You may propose a CSU degree program code and CIP code for each concentration that you would like to report separately from the major program.*

Not applicable. MS Program will not have formal options, emphasis areas, or concentrations.

f. *List any new courses that are: needed to initiate the program or needed during the first two years after implementation. Include proposed catalog descriptions for new courses.*

(1) Needed to initiate the program

ESCI 501 – Research Planning (4) – modified existing course
Problem solving and research planning for agriculture, natural resources and related sciences. Preparation of study plans that identify problems, review appropriate literature, formulate objectives, develop methods and provide for presentation and interpretation of results. Oral reports. 4 lectures.

ESCI 502 – Research Methods and Data Analysis (4) – new course
Quantitative and qualitative research methods for environmental science and management including research design, sampling, data collection, and data analysis. 3 lectures 1 lab. Prerequisite: Undergraduate course in statistics.

ESCI 550 – Advanced Environmental Science (4) – new course
Advanced study of earth system processes and environmental problems. Advanced application of systems thinking to study of energy, geologic systems, groundwater and surface water resources, soils, environmental pollution and degradation, atmospheric and ocean dynamics, and the global climate system.

ESCI 590 – Advanced Environmental Management (4) – new course
Principles of environmental management focused on human and ecosystem health. Examines topics such as air and water pollution, water use and management, aquatic ecosystems, energy and climate change, biodiversity, toxic substances, solid waste management, and strategies for risk management.

(2) Needed in the second year of implementation

ESCI 596– Project (5) – new course
Research or study toward a completed project that leads to an improved understanding of the physical environment, solution of an environmental problem, improved interaction between human society and the natural environment, or natural resources management.

ESCI 599 – Thesis (9) – modified existing course
Individual research in environmental science or management under the general supervision of faculty, leading to a graduate thesis. Degree credit limited to 9 units.

g. *Attach a proposed course-offering plan for the first three years of program implementation, indicating likely faculty teaching assignments.*

Fall 2019
- ESCI 501   Research Planning (Appel)
- ESCI 550   Advanced Environmental Sciences (Malama)

Winter 2020
- ESCI 502   Research Methods and Data Analysis (Brown)
- ESCI 590   Advanced Environmental Management (Verma, Chiu)

Spring 2020
- ESCI 581   Graduate Seminar (Surfleet)

Summer 2020
- ESCI 596   Professional Project (Various faculty)

Fall 2020
- ESCI 501   Research Planning (Appel)
- ESCI 550   Advanced Environmental Sciences (Malama)

Winter 2021
- ESCI 502   Research Methods and Data Analysis (Brown)
- ESCI 590   Advanced Environmental Management (Verma, Chiu)

Spring 2021
- ESCI 581   Graduate Seminar (Surfleet)

Summer 2021
- ESCI 596   Professional Project (Various faculty)

Fall 2021
- ESCI 501   Research Planning (Appel)
- ESCI 550   Advanced Environmental Sciences (Malama)

Winter 2022
- ESCI 502   Research Methods and Data Analysis (Brown)
- ESCI 590   Advanced Environmental Management (Verma, Chiu)

Spring 2022
- ESCI 581   Graduate Seminar (Surfleet)
- ESCI 596   Professional Project (Surfleet)

Summer 2021
- ESCI 596   Professional Project (Various faculty)

Proposed Course Offerings   2020 – 2022.
Fall 2020 – Spring 2022

Course	Fall	Winter	Spring	Summer
ESCI 501	X			
ESCI 502		X		
ESCI 550	X			
ESCI 590		X		
ESCI 581			X	
ESCI 596				X
ESCI 599	As needed	As needed	As needed	As needed

h. *For master's degree proposals, include evidence that program requirements conform to the minimum requirements for the culminating experience, as specified in Section 40510 of Title 5 of the California Code of Regulations.*

Per Section 40510 of Title 5 of the California Code of Regulations:

(1)The completion of a specified pattern of study approved by the appropriate campus authority.

The MS Degree was approved by Faculty Senate on XXXXXX.

(2) A minimum of thirty semester units of approved graduate work completed within a maximum time to be established by each campus.

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The MS degree requires completion of 45 quarter units, equivalent to 30 semester unit.

(A) Not less than 21 semester units (32 quarter units) shall be completed in residence.

The MS degree requires at least 32 quarter units be completed in residence.

(B) Not less than one-half of the units required for the degree shall be in courses organized primarily for graduate students.

The MS degree requires a minimum of 27 quarter units of 500 level courses.

(C) Not more than six semester units shall be allowed for a thesis or project.

The MS degree does not allow more than 9 quarter units for thesis or project.

(3) Satisfactory completion of a thesis, project, or comprehensive examination, defined as follows:

The MS degree requires completion of a thesis (9 quarter units) or a professional project (5 quarter units).

(4) A grade point average of 3.0 (grade of B) or better in all courses taken to satisfy the requirements for the degree, except that a course in which no letter grade is assigned shall not be used in computing the grade point average.

The MS degree requires a grade point average of 3.0 or better.

i. **For graduate degree proposals, cite the corresponding bachelor's program and specify whether it is (a) subject to accreditation and (b) currently accredited.**

There are several corresponding Cal Poly bachelor's programs for the proposed MS in Environmental Sciences and Management. Most relevant are the BS degrees in Environmental Management and Protection (ENVM), Environmental Earth and Soil Sciences (EESS), and Forestry and Natural Resources (FNR) offered through the NRES Department. The Forestry and Natural Resources degree is subject to accreditation by the Society of American Foresters (SAF) and is currently accredited through 2024. Graduates of these majors would have the necessary undergraduate coursework to enter the proposed MS degree program. Graduates from other programs such as Biology, City and Regional Planning, Geography, and Civil and Environmental Engineering may also be eligible subject to meeting program admission requirements. Our City and Regional Planning program is currently accredited by the Planning Accreditation Board (PAB) and our Civil and Environmental Engineering program is currently accredited by the Accreditation Board for Engineering and Technology (ABET).

j. **For graduate degree programs, specify admission criteria, including any prerequisite coursework.**

Minimum requirements for applicants to be considered are:

- Filing of an application for Graduate Admission via https://www2.calstate.edu/apply by the deadlines specified at http://admissions.calpoly.edu/applicants/
  - Submission of Graduate Record Exam (GRE) General Test scores electronically to Institution Code: R4038. While no minimum GRE scores have been established, they will be used along with other factors (statement of purpose, transcripts, recommendations, etc.) by potential thesis committee chairpersons as they consider student applications
  - Submission of three letters of recommendation from a source that can attest to the academic capabilities of the applicant. All letters of recommendation must be uploaded through Cal State Apply
  - Completion of a bachelor's degree from an accredited college/university with a minimum grade point average of 3.0 in the last 90-quarter units and completion of the following undergraduate coursework:
    Sciences— three quarters or two semesters of any combination of chemistry, biology, ecology, physics, earth science, or atmospheric science
    Statistics—one quarter or one semester
    Calculus—one quarter or one semester

  All applicants who do not speak and write English as their primary language are required to complete the Test of English as a Foreign Language (TOEFL), taken within the last 2 years with a minimum score of 550 (paper version), 213 (computerized version), or 80 (internet based). Submit scores electronically to Institution Code: 4038. This requirement does not apply if country of citizenship is listed on Cal Poly Admissions website: http://admissions.calpoly.edu/applicants/international/checklist.html

  Beyond the minimum requirements, the following considerations are relevant:
  - Completed undergraduate coursework in environmental studies subjects, broadly defined. An applicant who lacks prerequisite coursework may be admitted as a conditionally classified student and must make up any deficiencies (12 unit limit) before advancement to classified graduate standing.

k. *For graduate degree programs, specify criteria for student continuation in the program.*
Each quarter students are enrolled, satisfactory progress on the Formal Study Plan is expected to be made. Satisfactory academic progress shall be defined as maintaining a 3.0 graduate GPA. In addition, per University requirement, "graduate students are required to maintain continuous enrollment from the time of first enrollment in a graduate program until completion of the degree. Continuous enrollment is defined as being enrolled during Fall, Winter, and Spring quarters each year. Students can maintain continuous enrollment either by being enrolled as a regular student; obtaining approval for an education or medical leave prior to the quarter when such a leave would begin; or by registering in a special course designated for this purpose, during quarters in which they are not regularly enrolled. Students who fail to fulfill this continuous enrollment requirement will be not be permitted to graduate even if all degree requirements have been completed until payment has been made for all quarters of non-enrollment. In addition, all graduate students must be enrolled the quarter they graduate."

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l. *For undergraduate programs, specify planned provisions for articulation of the proposed major with community college programs.*
Not applicable for MS Degree.

m. *Provide an advising "roadmap" developed for the major.*
No applicable for MS Degree.

n. *Describe how accreditation requirements will be met, if applicable, and anticipated date of accreditation request (including the WASC Substantive Change process).*
Not applicable.

2. **SOCIETAL AND PUBLIC NEED FOR PROPOSED DEGREE MAJOR PROGRAM**

a. *List other California State University campuses currently offering or projecting the proposed degree major program; list neighboring institutions, public and private, currently offering the proposed degree major program.*

There are seven MS programs in in the CSU with titles of "Environmental Science" or "Environmental Studies". Some offer specific concentrations within the degree.

CSU	Degree	Title (Concentration)
Chico	MS	Environmental Science (Professional Science Master's)
Chico	MS	Environmental Science (General)
Dominguez Hills	MS	Environmental Science (General)
Fullerton	MS	Environmental Studies (Environment and Society)
Fullerton	MS	Environmental Studies (Environmental Sciences and Technology)
Los Angeles	MS	Environmental Science (Environmental Biology)
Los Angeles	MS	Environmental Science (Environmental Engineering Science)
Los Angeles	MS	Environmental Science (Environmental Hydrology)
Los Angeles	MS	Environmental Science (Geospatial Sciences)
San Bernardino	MS	Earth and Environmental Sciences (Geology)
San Bernardino	MS	Earth and Environmental Sciences (Professional Science)
San Jose	MS	Environmental Studies (Environmental Studies)
Monterey Bay (Fall 2018)	MS	Environmental Science (Marine and Watershed Studies)

University of California masters programs

The University of California has masters programs with an environmental science or management focus at the following campuses:

UC Berkeley
- Master of Forestry
- Master of Science in Range Management

UC Davis
- Master of Environmental Policy and Management (EPM)

UC Merced
- Master of Environmental Systems

UC Riverside
- Master of Science in Environmental Science
  - Environmental Chemistry and Ecotoxicology
  - Environmental Microbiology
  - Soil and Water Sciences

UC Santa Barbara
- MSEM—Master of Science in Environmental Science—two-year professional degree program designed for individuals who plan to enter or re-enter the workforce upon graduation

b. Describe differences between the proposed program and programs listed in Section 5a above.

The proposed MS-ESCI Cal Poly is an interdisciplinary degree that combines curriculum from the environmental sciences (natural and physical sciences) and environmental management. Students complete required core coursework in research methods, environmental science, and environmental management. The capstone degree requirement is completion of traditional research thesis (9 units) or a professional project (5 units). The Cal Poly program has both common and distinctive elements with other CSU Environmental Science programs described below.

Similarities and differences with other CSU Environmental Science programs:

● The Cal Poly MS-ESCI does not provide for specific concentrations like CSU Los Angeles and CSU San Bernardino but allows students to *design their own disciplinary concentration* through directed electives that comprise 18 out of 45 units.

● The option to complete either a professional project or traditional thesis as a culminating experience is similar to the MS program at CSU Los Angeles that provides for either a "Professional" or "Research" Experience.

● The MS-ESCI program does not require an internship, but students may complete an internship as an elective or as an embedded component of their professional project.

● Research and scientific literacy is emphasized in the Cal Poly curriculum (Research core) whether or not the student pursues a research project through the thesis option.

● A key component of the Cal Poly curriculum is an emphasis on management and protection of the environment and natural resources.

● The MS-ESCI program is distinctive in requiring students to integrate environmental science understanding with applied environmental management. The degree emphasizes the *integration* of science and management and does not favor one over the other.

Synopses of CSU Programs

The MS program at *Chico State University* emphasizes the geosciences (general MS option) and includes a Professional Sciences option that offers broader disciplinary coverage for students seeking management and non-academic positions.

The MS program at *CSU Dominguez Hills* has required courses in the natural and social sciences. An internship for credit is required. The capstone experience is completion of a thesis.

The MS program at **CSU Fullerton** is titled "Environment Studies" and is administered through the College of Humanities and Social Sciences. The program is interdisciplinary and spans environmental sciences, environmental policy and planning, and environmental education and communication. The culminating experience requires completion of a thesis, project, or comprehensive exam

The MS program at **CSU Los Angeles** offers three environmental science options in Environmental Biology, Environmental Engineering Science, or Environmental Hydrology. The degree offers two training experiences—Professional Experience and Research Experience. The culminating experience for the "Professional" option is completion of an internship and project and for "Research" option, the passing of an oral exam and completion of a thesis.

The MS program at **CSU San Bernardino** offers options in Geology and "Professional Science". The latter option is multidisciplinary and requires completion of an internship while the Geology requires completion of a thesis.

The MS program at **San Jose State** is titled "Environmental Studies" and provides students with foundational courses in the natural and social sciences and is thematically focused on "sustainability". The culminating experience is completion of a thesis.

The MS program at **Monterey Bay** will start in fall 2019 and is titled "Environmental Sciences" and will offer training in science and technology in the context of environmental policy. The current focus for their MS is in marine and watershed sciences. The culminating experience is completion of a thesis or a professional internship.

c. *List other curricula currently offered by the campus that are closely related to the proposed program.*

   The College of Agricultural, Food, and Environmental Sciences (CAFES) offers an MS degree in Agriculture with 10 different specializations. The new MS degree in Environmental Sciences and Management is related to, and will replace, the current MS degree in Agriculture with a specialization in Soil Science and the current MS degree in Forestry Sciences which are administered through the NRES Department.

d. *Describe community participation, if any, in the planning process. This may include prospective employers of graduates.*

   Community participation will not be required during the planning process.

e. Provide applicable workforce demand projections and other relevant data.

Cal Poly students with a MS Degree in Environmental Sciences and Management will meet the workforce needs for a range of environmental professions with employment opportunities in the following sectors:

- Local, state and federal agencies (e.g., research, natural resource management, environmental planning)
- Non-profit environmental organizations
- Universities and other educational settings
- Corporate (e.g., environmental consulting, environmental impact assessment, sustainability coordination)
- Government and Military Settings

The occupational outlook for *environmental scientists and specialists* published by the U.S. Bureau of Labor Statistics projects employment growth of 11 percent from 2016 to 2026, faster than the average for all occupations. The occupational outlook for *environmental science and protection technicians* is projected to grow 12 percent from 2016 to 2026, faster than the average for all occupations. The occupational outlook for *conservation scientists and forester*s is projected to grow 6 percent from 2016 to 2026, about as fast as the average for all occupations.

Source: https://www.bls.gov/ooh/life-physical-and-social-science/environmental-scientists-and-specialists.htm (visited *January 16, 2018*).

Data from State of California Employment Development Department shows employment estimates for environmental science and management related professions to be even stronger than federal estimates.

Area of Specialization	Sources of Data	Projected Growth 2014-2024	Avg. Annual Openings
Environmental Scientists and Specialists	State of California Employment Development Department	25.3%	880
Natural Sciences Managers	State of California Employment Development Department	20.7%	360
Soil and Plant Scientists	State of California Employment Development Department	27.3%	140
Foresters	State of California Employment Development Department	36.4%	90
Conservation Scientists SOC Code : 19-1031	State of California Employment Development Department	16.7 %	70

3. **STUDENT DEMAND**

   a. *Provide compelling evidence of student interest in enrolling in the proposed program. Types of evidence vary and may include (for example), national, statewide, and professional employment*
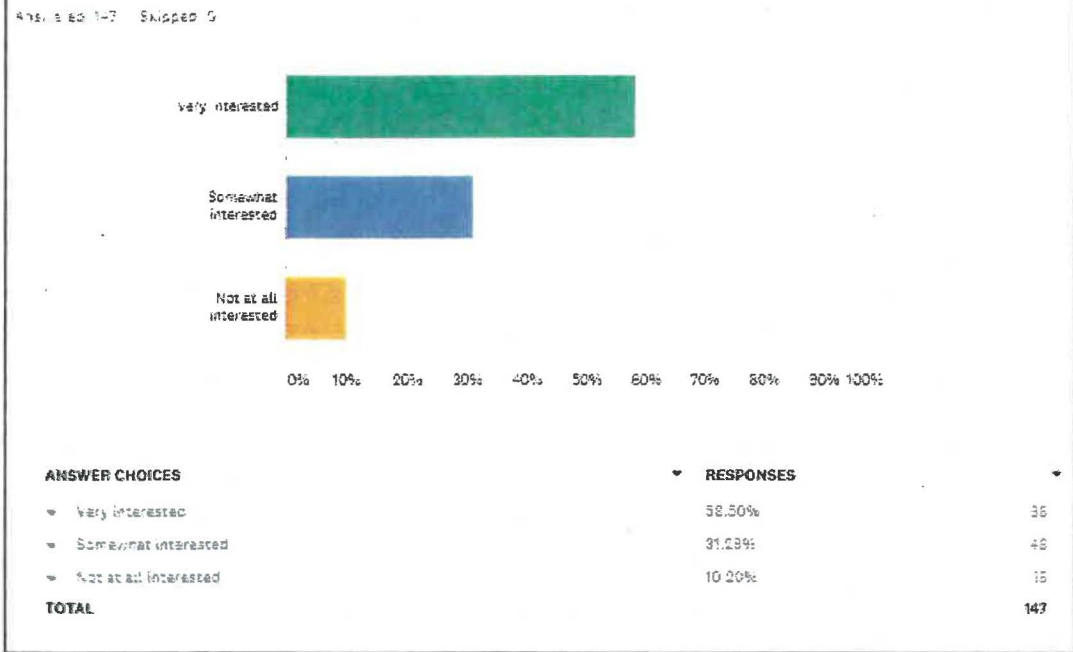
forecasts and surveys; petitions; lists of related associate degree programs at feeder community colleges; reports from community college transfer centers; and enrollments from feeder baccalaureate programs.

We anticipate student demand will come from a mix of undergraduate Cal Poly students seeking an advanced degree and external applications from other institutions. Conservatively, at least half of the target admission cohort each year (n=24) will likely come from Cal Poly graduates based on responses to an internal student demand survey presented below. This conclusion is based on an analysis of survey data indicating strong interest in the proposed MS degree.

In January 2018, we conducted a survey of undergraduate students in the NRES Department to determine the level of interest in the proposed MS program. The survey was completed by 147 students of which 58.5% were "very interested" in the MS degree (n=86). The data (see figures below) further indicate strong interest in professional training, supporting a professional project option as a culminating experience.

Each year we receive 10-20 inquiries for our existing MS in Forestry Sciences and MS in Agriculture with emphasis in Soil Science programs. This is followed by 4-8 applications each year for admission to one or the other program. The application numbers are limited due to the current thesis-only requirement, which discourages many students due to the admission requirement that a faculty member agree to be the student's adviser. Often faculty will not accept students without research funding, limiting our acceptance rate. Discussions with students inquiring about admission to our MS programs express interest in the new degree with a project-based culminating experience option.

If Cal Poly (NRES Department) were to offer a new Masters program in Environmental Sciences and Management in 2019, what would be your level of interest in enrolling in the program?

Answered 147   Skipped 9

ANSWER CHOICES	RESPONSES	
Very interested	58.50%	38
Somewhat interested	31.29%	48
Not at all interested	10.20%	15
TOTAL		**147**

In the future, if you did enroll in a Masters program, would you be more interested in research or professional training?

Answered 146   Skipped 1

ANSWER CHOICES	RESPONSES	
Research	42.47%	62
Professional training	57.53%	54
TOTAL		**146**
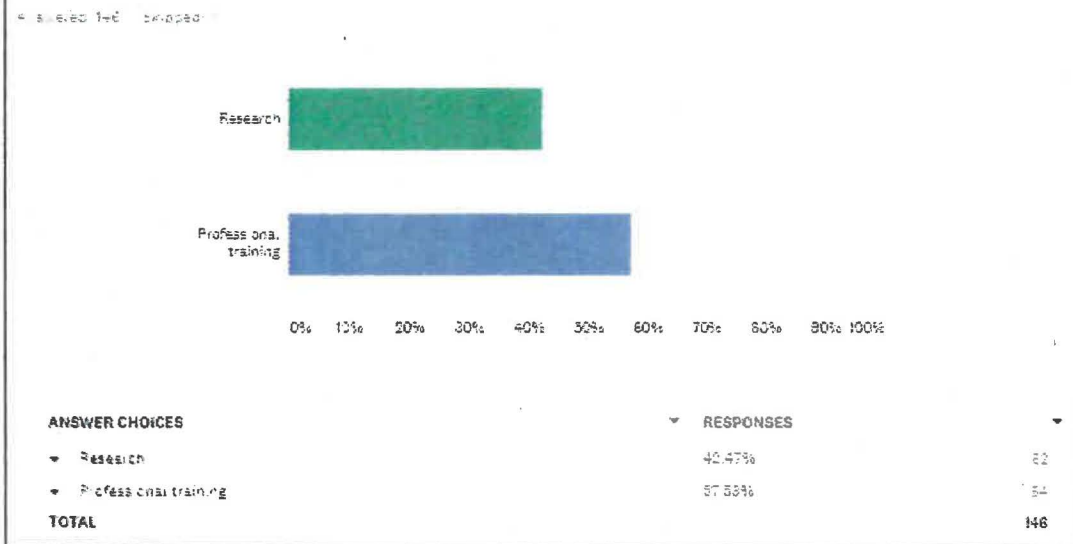
Students were allowed the option to provide open-ended comments (verbatim below). Students wanted more information about the program content, inquired about whether the program would be

offered as a 4+1degree option (not initially), and expressed interests in multiple environmental sub-disciplines.

Student Comments about Proposed MS Degree
This Master's program should tie in with the CRP Masters Program
I am very interested
Sounds really interesting. I will do my research on the program if the information is available.
I am currently looking into masters programs
Would need more information on topics
I would interested in knowing what kinds of emphasis areas or concentrations would be offered in this program.
I plan on completing a Master's Program and if Cal Poly offered one it would be my first choice!
I would jump at the opportunity to get my masters while creating a career project.
I fully plan to apply to Cal poly for a masters in ENVM once I graduate though I am currently a freshman
I am not personally interested in a masters program but I believe that having the option there is a great idea for our college.
I would very likely apply for a masters program starting in 2020.
For the above question, if there was a option in between not at all interested and somewhat interested, I would have chosen that one...maybe just slightly interested. I'd have to see what the course offerings would be and what they would cover. If it were more CEQA, policy, and EIR stuff for the upper divisions, count me out!
Please do this! Please
Affordability should remain a priority
I'd love that! It would also be extremely popular amongst my peers.
What would the program offer in comparison to the Forestry Sciences M.S.?
I would be more Inclined to enroll if it were on the 4-1 program.
I'm an EES major and I would be extremely interested in this program. I'd be interested to see what the focus of this would be.
Glad this is on its way!
Sounds awesome that's what i wanted mymajor to be
The master would be too broad. Y'all still have this attachment to the word Management, it needs to go. Employers get confused when the see management and protection, and typically reduce it to what in their minds as a bachelors or art degree in environmental studies.
PLEASE OFFER THIS. I am absolutely planning on going to grad school and being able to stay at Cal Poly would make the entire process so much easier. I love the staff at Cal Poly and I would love to have any one from our department as an advisor.
I aim to have a PhD in Environmental Management and hope to laboratory research in the future studying the urban environment and pollution.
I would be very interested but I haven't had a chance to think about it since there isn't a masters program and have already made plans to do something after. If the college

finalized the masters program but summer, I think it would be better because it would give a chance to think about it and make adjustment to future plans.
I support the creation of an Environmental Sciences and Management Masters program and would definitely plan on applying.
My enrollment would depend on the price of tuition, and the concentrations available to students. GO MUSTANGS
An example curriculum would peak my interest; it seems like most undergraduate classes prepare students for a variety of professional contexts. It almost seems like the current curriculum is a little lost and does not know where it is headed; a more specialized, career driven masters program would definitely interest me.
I would be interested in seeing what course offerings would be available for this masters degree. I am more interested in hydrology classes
I have been hoping the Cal Poly NRES department would offer a masters for ENVM since I got here!!
I would be interested in a Masters program directly focused on Public Policy and Environmental Law rather than a more science focused one.
Please make this a program!
I want to do a masters in environmental engineering so that I would have that background, it would be great if an ENVM master incorporated more engineering and science than the current bachelors does.
I am interested in applying for my masters.
I am planning on getting my masters in education here at calpoly
Depends on what the details of the program would be. As to next question, unsure because my career path may change significantly post-college.
Sounds like a great idea!
This would be a great option and opportunity for students at cal poly !
What is the curriculum proposed for said masters program?
I just wish this had been up for 2018 as I have already applied to master's programs for 2018, but I would absolutely apply for this program if it existed when I was a senior in undergrad.
yes please
Cal Poly is a great school and should definitely try to provide this program, the only reason I would not apply is because I would prefer to go to a graduate school separate from my undergraduate.
I would love to be a part of this graduate program, but am somewhat hesitant to be a "guinea pig" student at the very start of the program.

b. *Identify how issues of diversity and access to the university were considered when planning this program. Describe what steps the program will take to insure ALL prospective candidates have equitable access to the program. This description may include recruitment strategies and any other techniques to insure a diverse and qualified candidate pool.*

We are committed to achieving a diverse student group in the MS program. The Cal Poly undergraduate students most likely to enroll in the new program are already gender diverse

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(ENVM, EESS programs) thus contributing to a gender diverse MS program. For example, the 2017 incoming freshman class for the Environmental Management and Protection major (ENVM) was 61% female while the incoming freshman class for the Environmental Earth and Soil Science major (EESS) was 55%. A growing MS program with funded research projects will provide an opportunity to recruit individuals from diverse ethnic backgrounds and lower socio-economic status. Because the proposed program involves on-campus delivery of courses, issues of access for non-traditional students cannot be solved via a distance MS program approach. However, we will accommodate when possible, within the timeframe of grant funding, non-traditional students such as those in the workforce who may take a longer path to completion of the MS degree.

c. *For master's degree proposals, cite the number of declared undergraduate majors and the degree production over the preceding three years for the corresponding baccalaureate program, if there is one.*

	Undergraduate enrollment (Fall census)			Total degrees awarded		
	2017	2016	2015	2017	2016	2015
Environmental Management and Protection (ENVM)	341	276	257	51	49	46
Environmental Earth and Social Sciences (EESS, ESS, or ERSC)	245	210	157	33	40	27
Forestry and Natural Resources (FNR)	134	138	151	33	39	28

d. *Describe professional uses of the proposed degree program.*

Numerous opportunities exist for professional uses of the proposed MS degree program. The principal anticipated jobs and career paths are listed below:

- Local, state and federal agencies (e.g., research, natural resource management, environmental planning)
- Non-profit environmental organizations
- Universities and other educational settings
- Corporate (e.g., environmental consulting, environmental impact assessment, sustainability coordination)
- Government and military settings (e.g., environmental remediation)
- Research Scientist
- Environmental managers
- Postsecondary Educators
- Junior Colleges
- Lecturers at Universities
- MS as preparation for PhD in a broad range of areas

e. *Specify the expected number of majors in the initial year, and three years and five years thereafter. Specify the expected number of graduates in the initial year, and three years and five years thereafter.*

Numbers are based on an initial admission cohort of 24 students, an annual intake of 24 students, and an expected degree completion time of 1.5 years. The average degree completion time for the current thesis-only option is two years.

	At initiation	After 3 years	After 5 years
Number of Majors	24	36	36
Number of Graduates (total)	**	36	≥75
Basis for projection	Students that will be admitted	Anticipated # of students program can support	Anticipated # of students program can support

4. *EXISTING SUPPORT RESOURCES FOR THE PROPOSED DEGREE PROGRAM*

Note: Sections 7 and 8 should be prepared in consultation with the campus administrators responsible for faculty staffing and instructional facilities allocation and planning. A statement from the responsible administrator(s) should be attached to the proposal assuring that such consultation has taken place.

	At initiation	At 3 years	After 5 years
Faculty	1-2 new	Existing	Existing
Support staff	1 new	Existing	Existing
Facilities	Existing	Existing	Existing
Equipment	Existing	Existing	Existing
Information resources	Existing	Existing	Existing

List faculty who would teach in the program, indicating rank, appointment status, highest degree earned, date and field of highest degree, professional experience, and affiliations with other campus programs. Note: For all proposed graduate degree programs, there must be a minimum of five full-time faculty members with the appropriate terminal degree. (Coded Memo EP&R 85-20)

Name	Title	Areas of expertise
Dr. Chip Appel	Professor	- Soil and Water Chemistry - Tropical Soils
Dr. Greg Brown	Professor	- Environmental Planning and Policy - Natural Resource Management - Public Participation

Dr. Yi-Wen Chiu	Assistant Professor	- Environmental Management - Application of GIS - Life Cycle Analysis - Quantitative Simulation
Dr. Richard Cobb	Assistant Professor	- Forest Pathology - Forest Entomology - Ecosystem Ecology - Epidemiology
Dr. Charlotte Decock	Assistant Professor	-Soil health -Soil science
Dr. Chris Dicus	Professor	- Wildland Fire & Fuels Management
Dr. Samantha Gill	Professor	- Forest Biometrics - Forest Mensuration - Geographic Information Systems
Dr. Daniel Johnson	Lecturer	- Soil Science
Dr. Cristina Lazcano	Assistant Professor	- Sustainable Soil Management - Belowground ecological interactions and their effect in biogeochemical cycles - Carbon and nitrogen cycling in soils - Use of organic waste materials as fertilizers in agriculture - Environmental impacts of different fertilization strategies
Dr. Bwalya Malama	Assistant Professor	- Soil biophysics - Groundwater hydrogeology - Hydrogeophysics - Contaminant transport
Dr. Gordon Rees	Assistant Professor	- Pedology - Soil Mineralogy - Forest and Range Soils
Ms. Sarah Spann	Lecturer	- Environmental Impact Analysis - Environmental Regulations and Permitting - Environmental Planning
Dr. Chris Surfleet	Associate Professor	- Hydrologic Change due to Land Management - Water Quality - Watershed Assessment and Monitoring - Hydrologic modeling - Hydrologic Effects due to Climate Change
Dr. Stella Cousins	Assistant Professor	- Silvics - Silviculture - Forest ecology - Forest operations
Dr. Nick Babin	Assistant Professor	- Agroecology - Food systems - Sustainable development

a. Describe facilities that would be used in support of the proposed program.

Cal Poly has 5.8 million square feet in 149 major buildings to support educational activities. The majority of the courses for this MS program will occur in general purpose classrooms or computer laboratories utilized by the College of Agriculture, Food, and Environmental Sciences. All classrooms at Cal Poly are internet (Wi-Fi and Ethernet) ready and utilize Smart Room technology, including electronic projectors or monitors.

The NRES Department has three (3) computer labs and three (3) science lab rooms assigned to the Department for instruction and 13 lab spaces for research and support. When needed, other lab rooms are used on a shared basis. Assigned space under the direction of the Department is shown below.

Instructional Labs (6,300 sf)
The instructional classrooms are internet (Wi-Fi and Ethernet) ready and utilize Smart Room technology, including electronic projectors or monitors.

11-105 – Computer lab	837 sf (26 computers)
11-304 – Computer lab	1,075 sf (32 computers)
180-230 Computer lab	881 sf (32 computers)
11-302 Dendrology Science lab	1,140 sf (24 student capacity benches)
180-237 Soil Science lab	1,183 sf (24 student capacity benches)
180-239 Soil Fertility lab	1,184 sf (24 student capacity benches)

Research & Support Labs (20,585 sf)
All labs are equipped and monitored for academic-level instruction and research.

11-302A Lab Prep	240 sf
11-303 Equipment Room	450 sf
180-248 – Soil Prep lab	512 sf
180-248a Forest Health Research lab	93 sf
180-250 Chemistry Stock Room	432 sf
180-252 – Instrument lab	692 sf
180-241 – General Research lab	864 sf
180-254 – Equip Support	269 sf
52-D18 – Soil Health Research lab	1194 sf
52-D24 – Subsurface Water Research lab	137 sf
52-D25 – Subsurface Water Research lab	1202 sf
Soils Greenhouse	13,534 sf
Bldg. 11 Greenhouse	966 sf

Field Sites (6,000+ acres)
All NRES classes have a wide variety of university lands including forests, rangeland, cropland, reservoirs, streams and watersheds available to them for instruction, research and practice. The Department contributes to teaching and management of the Swanton Pacific Ranch, a living laboratory located in Santa Cruz County at the northern reaches of California's Central Coast and the Monterey Bay. The 3,200 acre property is a landscape composed of a majestic redwood

forest, lush riverine ecosystems and expansive coastal grassland overlooking the bay and the Pacific Ocean. Faculty, graduate students and undergraduates actively pursue research opportunities, utilizing the forest, range, and watershed resources within the ranch.

Lab Equipment in 180-252
Supports academic environmental exercises and research.
Horiba Ultima II - Inductively coupled plasma optical emission spectrometry (ICP-OES) used for the detection of chemical elements in aqueous solutions.
Varian 55B - Atomic absorption spectroscopy (AAS) used for the quantitative determination of chemical elements using the absorption of optical radiation (light) by free atoms in the gaseous state.
Elementar VarioMAX - Carbon and Nitrogen Combustion Analyzer used for carbon and nitrogen determination in plants and soils and a variety of other materials and have important applications in environmental studies.
Shimadzu GC 2014 - Gas Chromatograph (GC) used for greenhouse gas analysis by measuring the content of various components in a sample.

b. *Provide evidence that the institution provides adequate access to both electronic and physical library and learning resources.*

See Appendix 1.5.

c. *Describe available academic technology, equipment, and other specialized materials.*

Faculty and Students have access to the following:
- University-wide Information Technology
- PolyLearn Portal (Moodle)
- Office 365 email and calendar service
- Mustang Wireless Wi-Fi access.
- Office 365: One Drive (1 TB backup drive)
- Classroom response system technology (clickers, wi-fi enabled devices)
- Kennedy Library computer resources (*http://lib.calpoly.edu/use-tech-and-print/borrow-laptops-ipads-and-more/*)
- Over 300 computers throughout library
- Equipment loans: laptops, iPads, Kindles, and associated peripherals (e.g. headphones etc.), projectors, cameras,
- Data Studio: Assistance with large computing needs including GIS, data and maps.
- Cal Poly Print: print, copy and scanning services
- Assistive technology stations

5. ADDITIONAL SUPPORT RESOURCES REQUIRED

Note: If additional support resources will be needed to implement and maintain the program, a statement by the responsible administrator(s) should be attached to the proposal assuring that such resources will be provided.

a. *Describe additional faculty or staff support positions needed to implement the proposed program.*

The NRES Department will need to hire one new faculty member and one support technician to coincide with implementation of the new MS program. In addition to supporting the new program, the faculty member and technical support staff will also contribute to meeting teaching and support needs for undergraduate students in the department.

See letter of support - Dean of the CAFES.

b. *Describe the amount of additional lecture and/or laboratory space required to initiate and to sustain the program over the next five years. Indicate any additional special facilities that will be required. If the space is under construction, what is the projected occupancy date? If the space is planned, indicate campus-wide priority of the facility, capital outlay program priority, and projected date of occupancy. Major capital outlay construction projects are those projects whose total cost is $610,000 or more (as adjusted pursuant to Cal. Pub. Cont. Code §§ 10705(a); 10105 and 10108).*

The program will utilize existing space and resources to implement the curriculum.

c. *Include a report written in consultation with the campus librarian which indicates any necessary library resources not available through the CSU library system. Indicate the commitment of the campus to purchase these additional resources.*

See Appendix 1.5 for report from the Librarian for the College of Agriculture, Food, and Environmental Sciences.

d. *Indicate additional academic technology, equipment, or specialized materials that will be (1) needed to implement the program, and (2) needed during the first two years after initiation. Indicate the source of funds and priority to secure these resource needs.*

No additional academic technology, equipment or specialized materials are required to implement the program or during the first two years of the program.

6. SELF SUPPORT PROGRAMS
Not applicable. This degree is a state support program.

Appendix 1.3. Letter from Jim Prince, CAFES Associate Dean of Research and Graduate Programs

College of Agriculture, Food and Environmental Sciences
Dean's Office

CAL POLY

Date: April 30, 2018

To: Brian Self, Chair
             Academic Senate Curriculum Committee

CC: Michael McCullough, Chair, CAFES Curriculum Committee
             Richard Savage, Dean, Graduate Education
             Greg Brown, Head, NRES Department

From: Jim Prince, Associate Dean for Research and Graduate Programs
             College of Agriculture, Food, and Environmental Sciences

Re: New program: Master of Science in Environmental Science and Management

The CAFES Dean's Office strongly supports the proposal from the faculty of the Natural
Resources and Environmental Sciences Department for a new Master of Science in
Environmental Science and Management program. The program is thoughtfully constructed
and does not involve the allocation of significant additional resources. It has been carefully
vetted by both the departmental curriculum committee and the CAFES Curriculum Committee,
and the faculty have incorporated feedback from Graduate Education and Academic Programs
as well as the Dean's office.

This program will replace the current Master of Science in Agriculture with a specialization in
Soil Science as well as the Master of Science in Forestry Sciences.

Appendix 1.4. Letter from Michael McCullough, Chair CAFES Curriculum Committee

State of California   CAL POLY
                                                        SAN LUIS OBISPO
Memorandum

Date: April 30, 2018

To: Brian Self, Chair Academic Senate Curriculum Committee

Copy: Richard Savage, Dean, Graduate Education
                 Susan Olivas, Office of the Registrar

From: Michael McCullough, Chair
                 CAFES Curriculum Committee

Subject: Submission of 2019-21 Catalog Proposals

The CAFES Curriculum committee has finished reviewing the proposal for the new Master of Science in Environmental Sciences and Management. The committee unanimously voted to approve the proposal on April 27, 2018. This memo serves as notification, so the Academic Senate curriculum committee may begin their review.

Appendix 1.5. Library report.

CAL POLY
Robert E. Kennedy Library

To:	Dr. Greg Brown
	Natural Resources Management and Environmental Sciences
	College of Agriculture, Food and Environmental Sciences (CAFES)
From:	Katherine O'Clair
	College Librarian for the College of Agriculture, Food and Environmental Sciences
CC:	Adriana Popescu, Interim Dean of Library Services
	Tim Strawn, Interim Associate Dean
Date:	March 13, 2018
Re:	Library Resources to Support Master of Science in Environmental Sciences and Management

Summary

The Robert E. Kennedy Library at Cal Poly, San Luis Obispo has sufficient resources to support the new Masters of Science (MS) in Environmental Sciences and Management at an adequate level.

Kennedy Library provides access to a core collection of resources, including scholarly journals, indexing and abstracting databases, print and eBooks, to support teaching and learning in the new MS in Environmental Sciences and Management program. High-level research assistance and instructional support are currently offered to graduate students in the MS in Forestry Sciences and MS in Agriculture with Specialization in Soil Science programs, and these will continue to be available to students in the new MS in Environmental Sciences and Management program. Kennedy Library maintains a core collection of resources in print and electronic formats to support the natural resources management and environmental sciences curriculum at the undergraduate and graduate levels (MS in Forestry Sciences and MS in Agriculture with Specialization in Soil Science), and these will also be suitable for the new MS in Environmental Sciences and Management degree program. **This new degree program would benefit from the addition of several journals that would require additional funding of approximately $20,000.00 per year.** The need for other specific library materials may become apparent as students matriculate and the program develops. The Department of Natural Resources Management and Environmental Sciences should work with the CAFES College Librarian and the library's Data and GIS Specialist to request additional materials and services as they are identified.

Research Assistance, Instructional Support, and Facilities

Kennedy Library provides a subject-specialist (College Librarian), who is assigned to the College of Agriculture, Food and Environmental Sciences, to support students with their literature research and information seeking needs. The College Librarian is available to provide instruction on library resources for specific courses on an as-needed basis. The College Librarian also designs, develops, and maintains online Research Guides to connect users with information resources that are of use and value for specific disciplines and courses. The library's Data and GIS Specialist also provides instruction, online guides, and

individual research assistance on data and GIS resources and tools. It is recommended that all students enrolled in the MS in Environmental Sciences and Management program receive advanced, discipline-specific library and data/GIS instruction that is integrated into the curriculum to build proficiency in finding and using the information resources and tools that will be important to their studies and their careers as environmental science and management professionals. In addition, the library provides services and programs for all graduate students including Thesis Coaching and Graduate Student Boot Camp. Graduate students at Cal Poly also have access to dedicated facilities and spaces in the library. These include a group study room, a quiet study room, and personal lockers.

Information Resources to Support the MS in Environmental Sciences and Management

Indexing and Abstracting Databases

Kennedy Library provides access to several indexing and abstracting databases that students in the MS in Environmental Sciences and Management program will use for searching the literature to find articles and other publications. These include:
- *BIOSIS Previews* - Index to life sciences and biomedical research from journals, meetings, books, and patents. Covers pre-clinical and experimental research, methods and instrumentation, animal studies, and more. Includes BIOSIS indexing and enhanced MeSH disease terms.
- *CABI: CAB Abstracts* - CAB Abstracts provides research information on agriculture and related applied life sciences, including Agriculture, Animal Health, Forestry, Human Health and Nutrition, and Natural Resources Management. Global Health from CABI is the definitive international public health database.
- *GeoRef* - This comprehensive geoscience database covers topics in mineralogy and crystallography, general mineralogy, mineralogy of silicates, and mineralogy of non-silicates. Indexed content includes journal articles, books, maps, conference papers, reports, and theses. The geology of North America is covered from 1669 to the present, and global coverage dates back to 1933.
- *GreenFILE* - GreenFILE offers well-researched information covering all aspects of human impact to the environment, including global warming, green building, pollution, sustainable agriculture, renewable energy, recycling, and more.
- *Web of Science* - A multidisciplinary science database to search for articles from more than 8,500 of the most prestigious, high impact research journals in the world (1972-present).

Scholarly Journals

Scholarly journals are an important information resource for graduate-level study in Environmental Sciences and Management. Kennedy Library maintains a collection of over 2,100 electronic journals to support students in the degree programs currently offered by the Natural Resources Management and Environmental Sciences Department. The resources required to support these aforementioned degree programs will be equally important to the MS in Environmental Sciences and Management.

Journal Citation Reports was used to generate a list of environmental sciences-related journal titles. Of the top 40 journal titles ranked by impact factor (4.0 or greater), Kennedy Library maintains current online subscriptions to 29 of these, including:

- *Nature Climate Change* (19.304)
- *Land Degradation & Development* (9.787)
- *Environmental Health Perspectives* (9.776)

- *Frontiers in Ecology and the Environment* (8.039)
- *Environment International* (7.088)
- *Water Research* (6.942)
- *Global Environmental Change-Human and Policy Dimensions* (6.327)
- *Remote Sensing of Environment* (6.265)
- *Environmental Science & Technology* (6.198)
- *Journal of Hazardous Materials* (6.065)
- *Journal of Cleaner Production* (5.715)
- *Environmental Pollution* (5.099)
- *Earths Future* (4.938)
- *Science of the Total Environment* (4.90)
- *Conservation Biology* (4.842)
- *Environmental Modeling & Software* (4.404)
- *Environmental Research Letters* (4.404)
- *Reviews in Environmental Science and Bio-Technology* (4.40)
- *Water Resources Research* (4.397)
- *Environmental and Experimental Botany* (4.369)
- *Applied Catalysis A-General* (4.339)
- *Ecological Applications* (4.314)
- *Chemosphere* (4.208)
- *Energy Policy* (4.14)
- *Journal of Industrial Ecology* (4.123)
- *Agriculture Ecosystems & Environment* (4.099)
- *Waste Management* (4.03)
- *Biological Conservation* (4.022)
- *Journal of Environmental Management* (4.01)

New online subscriptions through the library should be considered for the following journals (based on turn-away and interlibrary loan data):

- *Global Change Biology* (8.502) - ~$7,500.00/year
- *Annual Review of Environment and Resources* (6.268) - ~$300.00/year
- *Critical Reviews in Environmental Science and Technology* (5.79) - ~$8,000.00/year
- *Global Biogeochemical Cycles* (4.655) - ~$900.00/year
- *Ecosystem Services* (4.072) – annual subscription cost to be determined

Journal articles not available through the library's subscriptions can be acquired by individual users through Interlibrary Loan, a service provided by the library free of charge to affiliated users. Interlibrary Loan requests for scholarly articles and book chapters are delivered digitally and usually within 1-2 days.

Books

In addition to journal articles, books will also be needed and utilized by students in the MS in Environmental Sciences and Management program. Kennedy Library provides over 7,100 print books and more than 12,000 electronic books covering the following ranges:
- G 70-70.6 – Geography – Methodology
- GB 450-460 – Coasts – Oceanography
- GB 651-2998 – Hydrology. Water

- GE – Environmental Sciences
- K 3581-3598 – Environmental Law
- QA 273-280 – Probabilities. Mathematical Statistics
- QE 1-350.62 – General Geology
- QH 1-278.5 – Natural History
- S 590-599.9 – Soils. Soil Science
- S 900-972 – Conservation of Natural Resources
- SD 411-428 – Conservation and protection (Forests)
- TD – Environmental Technology. Sanitary Engineering

These collection areas were reviewed in 2014 and 2016 and have been identified as an area of focus for ongoing monograph refresh with emphasis on eBooks and other electronic resources. As additional one- time monies are identified, either by CAFES or Kennedy Library, additional information resources should be acquired to continue to support this advanced degree program.

In addition to the monographs available at Kennedy Library, students also have access to over 20 million print monographs and journal volumes at the other CSU libraries through the CSU+ Resource Sharing Network. Requests for these books may be placed through OneSearch, and delivery of the item to Kennedy Library usually occurs within 3-5 business days.

Data and GIS

Robert E. Kennedy Library provides a range of information resources and services to support the academic needs of the program, including specific support for working with data, analysis, visualization, and GIS.

Data and GIS resources provided through the library include:
- Annual updates of the ESRI Demographics, Consumer Spending, and US Census American Community Survey geodatabases.
- Subscription to the ESRI ArcGIS Online platform and Living Atlas, an authoritative collection of GIS data from around the globe including satellite imagery, global land cover, soil and geology, climate, water resources and many other layers.
- Subscription to the Social Explorer online database with access to historical US Census and other datasets, in map or tabular format, from 1790 to present.
- Cal Poly campus, local government, and geospatial datasets from county, city, agency, and public sources stored on the campus GIS file server.

Reference support, class instruction, and in-depth research consultations with data and GIS projects are available through the Data & GIS Specialist, Russ White, and with student peer assistants, with backgrounds in data science and GIS.

The 300 computer workstations throughout the library provide access to the full suite of technical software licensed by Cal Poly including ArcGIS, AutoCAD, SPSS, Matlab, R, Python, Adobe and many others.

1 Master of Science in Environmental Sciences and Management, Cal Poly, San Luis Obispo

Appendix 2. Master of Science in Environmental Sciences and Management (MS-ESCI) Comprehensive Program Assessment Plan.

University Learning Objectives (ULOs)	Program Learning Objectives (PLOs)	Student Learning Objectives (SLOs)	Course where each SLO is assessed	Assessment activity (signature assignment) used to measure each SLO	Assessment tool used to measure outcome success	Assessment schedule – how often SLOs will be assessed	How assessment data will be reported as evidence SLO performance criteria have been met	Designated personnel to collect, analyze, and interpret student learning outcome data for the program	Student learning outcome data dissemination schedule	Closing the loop strategies
ULO1:Think critically and creatively ULO2: Communicate effectively ULO3: Demonstrate expertise in a scholarly discipline and understand that discipline in relation to the larger world of the arts, sciences, and technology ULO4:Work productively as individuals and in groups	PLO1: Apply appropriate research methods for data collection, analyses, and communication of environmental science and management problems. PLO2: Analyze a research problem or objective/ hypothesis (knowledge gap) and develop a research plan to address the problem or objective/ hypothesis	SLO1: Evaluate theory and critique research and defend a position. SLO2: Design and critique a scientific experiment using steps in the scientific method SLO3: Test hypotheses and draw correct inferences using both quantitative and qualitative analysis	ESCI 501 Research Planning ESCI 502 Research Methods and Data Analysis	**Research proposal**	Rubric designed for each SLO.	First year then every other year	Report on minimum percentage of students that meet or exceed standards for each SLO.	SLO instructor will assign and grade assessment using rubric developed for this assignment. An assessment committee will analyze rubric data.	Assessment data will be report to Academic Planning and Programs. The University Academic Assessment Council will review the reports and provide feedback. Feedback will be used to improve assessment for the following year.	The assessment committee will review the data and identify where improvement is needed.
ULO1:Think critically and creatively ULO2: Communicate effectively ULO3 Demonstrate expertise in a scholarly discipline and understand that discipline in relation to the larger world of the arts, sciences, and technology ULO4:Work productively as	PLO3: Execute a research plan (research design, data collection, analyses, and communication) or professional project plan to completion PLO4: Communicate research or professional project outcomes effectively using oral, written and digital media communication appropriate for the discipline PLO5: Synthesize and communicate core knowledge content	SLO5: Research, design, develop, and implement a capstone research study or professional project that solves a scientific problem or affects positive organizational and/or social change	ESCI 599	**Thesis project/ oral presentation**	Rubric designed for each SLO.	Once every two years starting in year two.	Report on minimum percentage of students that meet or exceed standards for each SLO.	The thesis chair will administer and grade the assessment using rubric to assess the thesis. An assessment committee will analyze rubric data.	Assessment data will be report to Academic Planning and Programs. The University Academic Assessment Council will review the reports and provide feedback. Feedback will be used to improve assessment for the following year.	The assessment committee will review the data and identify where improvement is needed.
		SLO5: Research, design, develop, and implement a capstone	ESCI 596	**Professional project/ oral presentation**	Rubric designed for each SLO.	Once every two years starting	Report on minimum percentage of students that meet or	SLO instructor for project course will assign and grade project	Assessment data will be report to Academic Planning and Programs. The	The assessment committee will review the data and identify where

1 Master of Science in Environmental Science and Management, California Polytechnic State University, San Luis Obispo

individuals and in groups ULO5:Use their knowledge and skills to make a positive contribution to society ULO6:Make reasoned decisions based on an understanding of ethics, a respect for diversity, and an awareness of issues related to sustainability ULO7:Engage in lifelong learning	contained within at least one environmental science sub-discipline PLO6: Apply scientific knowledge to the management of environmental problems PLO7: Demonstrate ethical reasoning and choose an appropriate course of action based on ethical standards in the research discipline and the research process in general including publication and intellectual property PLO8: Analyze, interpret and explain how environmental, economic, and social systems interact to promote the sustainable management of environmental and natural resources	research study or professional project that solves a scientific problem or affects positive organizational and/or social change				in year two.	exceed standards for each SLO.	using rubric developed for professional project	University Academic Assessment Council will review the reports and provide feedback. Feedback will be used to improve assessment for the following year.	improvement is needed.
ULO2: Communicate effectively ULO3 Demonstrate expertise in a scholarly discipline and understand that discipline in relation to the larger world of the arts, sciences, and technology ULO4:Work productively as individuals and in groups	PLO5: Synthesize and communicate the core knowledge content contained within at least one environmental science sub-discipline. PLO8: Analyze, interpret, and explain how environmental, economic, and social systems interact to promote the sustainable management of environmental and natural resources	SLO4: Analyze and evaluate multiple perspectives and interpretations associated with various environmental and social science theories and defend or refute their merits	ESCI 550 Advanced Environmental Science ESCI 590 Advanced Environmental Management	**Written paper**	Rubric designed for each SLO.	First year then every other year	Report on minimum percentage of students that meet or exceed standards for each SLO.	SLO instructor will assign and grade assessment using rubric developed for this assignment. An assessment committee will analyze rubric data.	Assessment data will be report to Academic Planning and Programs. The University Academic Assessment Council will review the reports and provide feedback. Feedback will be used to improve assessment for the following year.	The assessment committee will review the data and identify where improvement is needed.

1 Master of Science in Environmental Sciences and Management, Cal Poly, San Luis Obispo

Appendix 3. Master of Science in Environmental Sciences and Management (MS-ESCI) Curriculum Mapping Matrix.

	COURSE ESCI 501 Research Planning	COURSE ESCI 502 Research Methods and Data Analysis	COURSE ESCI 581 Graduate Seminar in Environmental Sciences	COURSE ESCI 550 Advanced Environmental Science	COURSE ESCI 590 Advanced Environmental Management	COURSE ESCI 596 Professional Project	COURSE ESCI 599 Thesis
SLO1: Evaluate theory and critique research and defend a position.	I/D		D	D	D	M	M
SLO2: Design and critique a scientific experiment using steps in the scientific method	I/D	M				M	M
SLO3: Test hypotheses and draw correct inferences using both quantitative and qualitative analysis	I/D	M				M	M
SLO4: Analyze and evaluate multiple perspectives and interpretations associated with various environmental and social science theories and defend or refute their merits			D	M	M		
SLO5: Research, design, develop, and implement a capstone research study or professional project that solves a scientific problem or affects positive organizational and/or social change	I/D					M	M

Program content is introduced (I), developed (D), and/or mastered (M).

-96-

FW: MS ESCI

Gregory Gordon Brown

Tue 5/22/2018 10:14 AM

To: Gladys E. Gregory <ggregory@calpoly.edu>;

📎 2 attachments (373 KB)

MS-ESCI proposal v26 Draft 1-bps.docx; RE: MS ESCI;

See email below. ASCC is supportive. Changes requested were minor and have been implemented.

--
Greg Brown (ggbrown@calpoly.edu)
Professor and Department Head
Natural Resource Management & Environmental Sciences
California Polytechnic State University

Visit the Landscape Values & PPGIS Institute (www.landscapevalues.org)

From: Brian P. Self
Sent: Friday, May 18, 2018 10:01 AM
To: Gregory Gordon Brown <ggbrown@calpoly.edu>
Cc: Michael P. McCullough <mpmccull@calpoly.edu>; Susan Olivas <solivas@calpoly.edu>
Subject: MS ESCI

Hi Greg

In general, the ASCC was supportive of the proposal. We did have a few suggestions, many of which are included in the attached document using Track Changes. I have just rolled back the different courses to the proposers – although perhaps I should have done this to the NRES Curr Chair instead. We would like to make sure the PLOs listed in the Course Proposals match those that are in your Program Proposal. Additionally, some of the different quarters of when classes will be offered do not match up.

Finally, we think the curriculum would be improved by adding in some pre-requisites. One natural one would be to have ESCI 501 serve as a pre-req to ESCI 502. Other pre-req and/or concurrent requirements would also add some flow to the offerings.

Mike can also help with some guidance since he was at the meeting. If you would like Susan to adjust the Workflow of the courses so that they come to one of you, please let her know. If you can do the adjustments on the courses before Tuesday, we can get them on the Senate consent agenda this year.

Best,
Brian

Brian P. Self, PhD
Chair, Academic Senate Curriculum Committee
Professor of Mechanical Engineering
California Polytechnic State University
San Luis Obispo, CA 93407-0001
805-756-7993

Spring Office Hours
M 3-4pm, W 230-330pm, Th 10-11am
Sunday online, 9-10pm

State of California

CAL POLY

Memorandum

To:	Greg Brown, NRES Dept, Department Head	**Date:**	February 14, 2018
From:	Terry Jones, Anthropology and Geography, Department Chair	**File:**	

Copies:

Subject: PROGRAM REQUIREMENT CHANGE WHICH INVOLVES A COURSE IN YOUR DEPARTMENT

We are proposing the following program change which involves a course in your department:

Current Requirement	Proposed Requirement
None. New program.	Some MS-ESCI students may choose to take 400 level elective courses offered in Geography

Program (Major/Concentration/Minor): MS in Environmental Sciences and Management (MS-ESCI)
Approximate number of students enrolled in program: Annual admissions cohort of 24. On average, 35 students in program given 1.5 year completion rate.
Reason for change: Adding new MS program

Please check the appropriate box and return a signed copy of this memo to me.

☒ I have no concerns regarding the proposed curriculum change. (Comments below are optional)

☐ I have concerns regarding the proposed curriculum change and have included comments below.

Statement of support or concern:

_____

_____

_____

_____

_____

Signature of Department Head or Chair   5/11/18
                                               Date

Terry Jones

Print Name

State of California

CAL POLY

Memorandum

To:	Greg Brown, NRES Dept. Department Head	**Date:**	February 14, 2018
From:	Ken Hillers, Biology Department, Department Chair	**File:**	

Copies:

Subject: **PROGRAM REQUIREMENT CHANGE WHICH INVOLVES A COURSE IN YOUR DEPARTMENT**

We are proposing the following program change which involves a course in your department:

Current Requirement	Proposed Requirement
None. New program.	Some MS-ESCI students may choose to take 400 or 500 elective courses offered in the undergraduate and graduate Biology programs

Program (Major/Concentration/Minor): MS in Environmental Sciences and Management (MS-ESCI)

Approximate number of students enrolled in program: Annual admissions cohort of 24. On average, 35 students in program given 1 5 year completion rate.

Reason for change: Adding new MS program

Please check the appropriate box and return a signed copy of this memo to me.

☑ I have no concerns regarding the proposed curriculum change. (Comments below are optional)

☐ I have concerns regarding the proposed curriculum change and have included comments below.

Statement of support or concern:

_____

_____

_____

_____

_____

_____

Signature of Department Head or Chair   3-13-18
                                               Date

Ken Hillers

Print Name

State of California

CAL POLY

Memorandum

To:	Greg Brown, NRES Dept, Department Head	**Date:**	February 14, 2018
From:	Charles Chadwell, Civil and Environmental Engineering, Department Chair	**File:**	

Copies:

Subject: **PROGRAM REQUIREMENT CHANGE WHICH INVOLVES A COURSE IN YOUR DEPARTMENT**

We are proposing the following program change which involves a course in your department:

Current Requirement	Proposed Requirement
None. New program.	Some MS-ESCI students may choose to take 400 or 500 elective courses offered in the Civil and Environmental Engineering programs

Program (Major/Concentration/Minor): MS in Environmental Sciences and Management (MS-ESCI)

Approximate number of students enrolled in program: Annual admissions cohort of 24 On average, 35 students in program given 1.5 year completion rate.

Reason for change: Adding new MS program

Please check the appropriate box and return a signed copy of this memo to me.

x I have no concerns regarding the proposed curriculum change. (Comments below are optional)

☐ I have concerns regarding the proposed curriculum change and have included comments below.

Statement of support or concern:

I have not concerns and look forward to collaborating with the students of the new MS-ESCI Program.

Signature of Department Head or Chair   Date 2/14/18

CHARLES CHADWELL

Print Name

State of California

M e m o r a n d u m

CAL POLY

To:	Greg Brown, NRES Dept, Department Head	**Date:**	February 14, 2018
From:	Michael Boswell, City and Regional Planning, Department Head	**File:**	

Copies:

Subject: PROGRAM REQUIREMENT CHANGE WHICH INVOLVES A COURSE IN YOUR DEPARTMENT

We are proposing the following program change which involves a course in your department:

Current Requirement	Proposed Requirement
None. New program.	Some MS-ESCI students may choose to take 400 or 500 elective courses offered in the undergraduate and graduate CRP programs, especially those student interested in environmental planning

Program (Major/Concentration/Minor): MS in Environmental Sciences and Management (MS-ESCI)

Approximate number of students enrolled in program: Annual admissions cohort of 24. On average, 35 students in program given 1.5 year completion.

Reason for change: Adding new MS program

Please check the appropriate box and return a signed copy of this memo to me.

☒ I have no concerns regarding the proposed curriculum change. (Comments below are optional)

☐ I have concerns regarding the proposed curriculum change and have included comments below.

Statement of support or concern:

We look forward to the opportunity to work with NRES on offering supporting electives.

_____   5/12/18

Signature of Department Head or Chair   **Date**

Michael R Boswell

Print Name

Adopted:

ACADEMIC SENATE
Of
CALIFORNIA POLYTECHNIC STATE UNIVERSITY
San Luis Obispo, CA

AS-__-18

RESOLUTION TO UPDATE CAMPUS POLICY ON FACULTY OFFICE HOURS

1	WHEREAS,	The Campus Administrative Manual policy (CAM) 370.2.D.1 regarding
2		faculty office hours has not been updated since 1980; and
3		
4	WHEREAS,	Methods for interacting with students outside the classroom and for
5		communicating office hours to the University community have
6		evolved significantly since the policy was last revised; and
7		
8	WHEREAS,	Individual departments and programs as well as student
9		constituencies may have different needs with regard to the purpose
10		and delivery of office hours; and
11		
12	WHEREAS,	~~Colleges and their individual departments and programs, in~~
13		~~consultation with~~ Faculty members, and others working in an
14		instructional capacity, within individual departments and programs
15		~~and students,~~ are best suited to determine the optimal method(s) and
16		delivery of office hours to meet students' needs; therefore be it
17		
18	RESOLVED:	That the Academic Senate endorses the adoption of the attached
19		Office Hour Policy Language for the Campus Administrative Policy
20		(CAP) to replace CAM 370.2.D.1; and be it further
21		
22	RESOLVED:	That each department and program will continue to use the existing
23		CAM Office Hour Policy 370.2.D.1 until their new policies are adopted.

Proposed by: Office Hours Task Force
Date: February 1, 2018
Revised: May 24, 2018

A. Policies concerning workload are covered in the collective bargaining agreement for faculty unit employees.

In those cases where faculty members volunteer to accept an assignment which exceeds the average of 45 Weighted Teaching Units (WTU's) per academic year, the faculty member should file a written statement to that effect in his/her Personnel Action File. Personnel Form 115 may be used for this purpose.

B. Academic Year

Since Cal Poly is on a quarter system year-round operation, the academic year consists of any three academic quarters in a period of four consecutive academic quarters. Unless otherwise specified for an individual faculty member, the academic year begins with the fall quarter.

C. Administrative Time, Assigned Time, and Other Support Time

Administrative time, assigned time, and other support time should be recorded by the department head/chair and approved by the dean and Vice President for Academic Affairs, using Forms 107A, 107B and 107C, available in the Personnel Office.

D. Faculty Members' Schedules

1. Office Hours

Normally, each full-time faculty member schedules and conducts at least five office hours each week for consultation with students. Deans may approve a variation in consultation with the department. Part-time and full-time faculty with reduced teaching loads schedule office hours in proportion to their

assignments. Faculty members are requested to post their office hours outside their office doors and provide a copy to the department head/chair. (See also collective bargaining agreement for faculty unit employees.)

2. Temporary Schedule Deviations

Requests for approval for deviations from the established class or office hour schedule should be submitted to the department head/chair. The faculty member shall secure appropriate approval and notify the departmental office whenever a class is not to be held in the specifically assigned room or laboratory even though the change is for only one day; this is necessary so that students or the faculty member can be reached quickly in case of emergency. (See also CAM 235.1.)

E. Common Responsibilities of Department Heads/Chairs

1. The instructional department head/chair is responsible for planning, organizing and directing the activities of the department within the total structure of the University's academic administration. Appointment is made by the dean after consultation with the faculty of the department, the Vice President for Academic Affairs and the President. Such appointments will normally be continued so long as they are satisfactory to the appointee, department faculty, and to the dean. The department head/chair serves at the discretion of the dean.

CAP – Office Hour Policy Language
Office Hours Task Force

The primary goal of office hours is to provide instructional assistance to students. In meeting this goal, office hours can take many forms. All faculty members and others working in an instructional capacity will have regularly scheduled office hours throughout each quarter, as part of their instructional responsibilities, consistent with their teaching load. The faculty members of each academic department and program, in consultation with their respective dean's office, will set an appropriate office hour policy. A schedule of office hours, their manner of delivery, and contact information will be included on each course syllabus, communicated to the department and program, and made readily available through official University-wide communication channels.

Supporting Documentation

The Office Hours Task Force (OHTF) was formed in Winter 2017 to develop new language for the Campus Administrative Manual to replace the current policy, which has been in place since 1980. After review and discussion of office hour policies from other CSU campuses at several meetings throughout Winter, Spring, and Fall 2017, and considering input from the ASI board of directors received in Fall 2017, the OHTF developed the preceding policy language. The aim was to clarify the intent of office hours and establish a general process for the development of specific office hour policies appropriate to individual departments or programs. Expectations for the dissemination of office hour information are also provided.

This supporting documentation is intended to provide suggestions and guidance for individual departments and programs, in consultation with their respective dean's offices, to consider as they develop specific office hour policies appropriate to their students' needs. Following these general guidelines are a set of specific draft policies developed by task force members for their departments, to give an idea of the variety of possible forms such policies may take.

In developing office hour policies, the OHTF encourages departments and programs

- To determine the specific constituencies of students served by office hours and seek to ensure that these students' needs will be met by their policies. *Examples include introductory service course students vs. upper division students vs. graduate students vs. distance learning or online course students, etc.*

- To consider reviewing practices from other CSU campuses or institutions of similar size and composition when developing or revising their office hour policies. *(See the attached Office Hours Report for links to other CSU campus policies.)*

- To draft policies that clearly communicate to faculty members or others working in an instructional capacity the expectations regarding when office hours must be held, and where and in what manner student consultations outside of class may be considered office hours. *Examples include hours held during the first week of classes, final exams week; in-person vs. online interactions; asynchronous communications such as responding to student emails, etc.*

- To draft policies that clearly delineate expectations for part-time instructors or faculty members teaching reduced loads during a given term. *Examples include pro-rated office hours, online vs. in-person interactions, etc.*

- To review periodically their policies and solicit feedback and input from faculty members, others serving in an instructional capacity, and students on the efficacy of current policies to determine if they require revision.

- To provide an easy-to-find single source for disseminating office hour information campus-wide. *Examples may include publication alongside faculty directory information, campus calendar, etc.*

Department office hour policy EXAMPLES

The following draft policies give an idea of the variety of approaches for developing department and program level office hour policies.

Physics (DRAFT)

The primary purpose of office hours is to provide assistance to students outside the classroom. To meet the needs of students, faculty members and others working in an instructional capacity, will

1. Hold a minimum of one regularly scheduled office hour per week throughout each quarter and during finals week as part of their instructional responsibilities, while engaged in any teaching assignment.
    a. These hours will be fixed in time but may be delivered in whatever *synchronous* manner is deemed appropriate by the instructor (e.g. in office, in lab, via online chat, at the physics tutoring center, etc.).
    b. Information about the schedule and manner of delivery will be communicated by the instructor to the department office before week 1 and will be communicated by the office staff through appropriate University-wide communication channels (e.g. department website, University directory, etc.).
2. Develop a schedule and manner of delivery for additional hours of assistance to students, which may include time spent responding to emails, holding online discussions, working in the physics tutoring center, etc., pro-rated by the assigned teaching load of the instructor, at 1 hour per week per 3 WTUs.
    a. For teaching loads not divisible by 3, the instructor may round up or down to the nearest whole number of hours at their discretion, independent of the mandatory one synchronous hour per week described above.
    b. The total number of required office hours per quarter will be no less than 11 and will not exceed 55, consistent with a 15 WTU teaching assignment.
    c. A maximum of 50% of the additional hours may be delivered asynchronously, (i.e. responding to emails, etc.)

3. Distribute their office hour load throughout the quarter and during finals week as appropriate to meet the needs of their students.
   a. Instructors may choose to increase the number of hours they make themselves available to students during exam weeks, prior to assignment due dates, etc. and correspondingly decrease the number of hours at other times.
   b. Instructors may choose to identify hours devoted to a specific population of students (e.g. upper division vs. introductory, lab vs. lecture), provided that their total hours are equitably distributed among the different groups they are serving in a given quarter.
   c. Instructors without scheduled final exams or exams scheduled early in finals week may adjust accordingly their office hours before or during finals week as appropriate to serve the needs of their students.
4. Will communicate their specific schedule, location, and means of delivery of all office hours to their students on each course syllabus and to the department office staff by the beginning of week 2 of the quarter for wider distribution by office staff through appropriate University-wide communication channels (e.g. department website, University directory, etc.)
5. Will consult with the department chair for approval before implementing any variations not covered in this document to ensure they are in compliance with department expectations for manner and delivery of office hours.

These policies will be reviewed and revised, as needed, by the department curriculum committee every three years, beginning with the first date of adoption. The reviewed and/or revised policies will be presented to the department for discussion and feedback before being adopted by majority vote of all faculty members and others working in an instructional capacity during the academic year when the policies are reviewed.

First adopted by majority vote (XX-YY-ZZ) on XX-XX-XXX.

Biological Sciences (DRAFT)

INTRODUCTION

Biology Department faculty members have diverse opportunities for face to face interaction with students, such as lectures, seminars, labs, field courses, and 'By Arrangement" independent study courses. However, faculty members shall also provide an opportunity for communication with students and others through regularly scheduled face to face, and/or "virtual" (e.g. electronic), office hours depending on the amount and mode of instruction.

1.0   NUMBER OF OFFICE HOURS

Biological Sciences faculty members that are teaching a full 12 WTU teaching load (generally 9 WTU in-class and 3 WTU independent study) are expected to hold a minimum of 2 regularly scheduled office hours per week, preferably divided into at least two different days and times. For faculty members teaching less than a full load, the minimum number of scheduled office hours shall be prorated, but may not be less than one hour per week unless the faculty member is not teaching. Faculty members shall also clearly articulate a reasonable policy by which they will interact with students through other means, such as phone conversation and electronic methods. For example, "If you email me with a request, I will respond within 24 hours."

2.0   MODE OF OFFICE HOURS

2.1   Faculty Teaching Online, Hybrid or Field Courses.

Ideally, the way in which office hours are held should be consistent with the mode(s) of instruction; faculty teaching online, hybrid or field courses may determine the most appropriate mode for their office hours in consultation with the department chair.

2.2   Faculty Teaching Traditional Courses.

2.2.1   Regardless of the number of WTUs a faculty member may be teaching, all faculty who teach one or more courses with face-to-face instruction are required to hold a minimum of one hour of regularly scheduled face to face office hours.

2.2.2   The face-to-face office hour requirement cannot be met, entirely or in part, by stipulating "by appointment only."

2.2.3   Typically, face-to-face office hours are held in the faculty member's office at times most likely to be accessible to the students.

2.2.4   Regardless of teaching load, a minimum of one face to face office hour is required during finals week. Ideally, the meeting day/time should occur before scheduled exams, can be different from other quarterly office hours, and must be announced in class and articulated in written form (e.g. syllabus, e-mail, posted on an exterior office bulletin board) by Week 10 of the quarter. In the event that a face to face office hour cannot be scheduled before an exam, and/or the teaching mode not traditional, the faculty member shall articulate an appropriate alternative (e.g. electronic office hour at a designated time).

2.2.5   Each faculty member may schedule additional office hours (i.e. those beyond the required office hours) in any manner purposefully designed to meet student needs.

3.0   COMMUNICATION OF OFFICE HOURS

3.1   <u>Notification to Department</u>. Faculty members shall notify their department office of their scheduled office hours no later than the week prior to the first week of instruction.

3.2   <u>Posting</u>. The faculty member's office hours and e-mail address must be posted outside the faculty member's office door and made available in the department office.

3.3   <u>Syllabus</u>. Office hours, including schedule, location, and contact information, shall be listed on the syllabus for each course. Office hour policy should also be communicated to students during the first class meeting.

4.0   CANCELLATION OF OFFICE HOURS

Faculty shall notify their department office and students in the event that they are unable to meet scheduled office hours. A notice shall be posted on the faculty member's door when office hours are cancelled.

Experience Industry Management (DRAFT)

Faculty members shall
- Maintain a minimum of 5 scheduled hours if teaching a regular load
- Spread office hours out over multiple days and times to meet the diverse scheduling constraints of students
- Post office hours outside their offices
- Email students EVERY time ANY change is made to office hours

Adopted:

ACADEMIC SENATE
Of
CALIFORNIA POLYTECHNIC STATE UNIVERSITY
San Luis Obispo, CA

AS-__-18

RESOLUTION CONDEMNING RECENT EVENTS AT LAMBDA CHI ALPHA

1 2 3 4 5 6	WHEREAS,	Photographic evidence posted to social media shows that the Lambda Chi Alpha Fraternity House hosted a party coinciding with PolyCultural Weekend during which at least one student attended wearing blackface and numerous others dressed in "gangster" attire in a photo captioned "she wants a gangster not a pretty boy"; and
7 8 9 10 11 12 13 14 15 16	WHEREAS,	Academic Senate Resolution AS-807-15 "Resolution on Cal Poly Statement on Diversity and Inclusivity" (Approved November 17, 2015), states, in part: "Cal Poly is an inclusive community that embraces differences in people and thoughts. By being open to new ideas and showing respect or diverse points of view, we support a climate that allows all students, faculty, and staff to feel valued, which in turn facilitates the recruitment and retention of a diverse student population. We are a culturally invested university whose members take personal responsibility for fostering excellence in our own and others' endeavors"; and
17 18 19 20 21 22 23 24	WHEREAS,	The images from the Lambda Chi Alpha gathering foster an environment in which students of color and other historically underrepresented populations feel both unwelcome and unsafe at Cal Poly, as attested to by speakers at a Town Hall hosted by the Black Student Union on Monday, April 9, 2018, and by the peaceful protests and boycotts joined by a diverse group of student organizations during Cal Poly's 25the Annual Open House weekend; therefore be it
25 26 27 28 29	RESOLVED:	That the Academic Senate condemns the actions of the Lambda Chi Alpha, Phi Sigma Zeta Chapter, as an affront to our community standards, our academic endeavors, and the desire to create a more diverse and inclusive environment, and be it further
30 31 32 33	RESOLVED:	That the Academic Senate stands in solidarity with all student groups, administrators, and community members seeking to transform the University into a more diverse and welcoming environment for students from historically underrepresented populations.

Proposed by: Gregory F. Domber, Lecturer History Department
and Seth D. Hanna, Lecturer Sociology Department
Date: May 3, 2018

Adopted:

ACADEMIC SENATE
Of
CALIFORNIA POLYTECHNIC STATE UNIVERSITY
San Luis Obispo, CA

AS-___-18

RESOLUTION ON LIMITING CAMPUS SPENDING FOR SPEAKERS INVITED BY STUDENT CLUBS

Background:

In April of 2018, The Cal Poly College Republicans and the Cal Poly chapter of Turning Point USA, hosted an event featuring Milo Yiannopoulos at Cal Poly. Cal Poly ended up spending $46,600 and the CSU spent $39,600, for a total of $86,200 for security for the event. Security costs included wages and overtime for staff, including 17 university police officers, 54 officers from other CSU campuses and 58 officers from other law enforcement agencies.

The previous year, in January of 2017 the Cal Poly Republicans invited "~~professional provocateur~~" Milo Yiannopoulos to campus. The University (with funds from the CSU), spent more than $55,000 and the city of San Luis Obispo spent more than $9,000 on security due to concerns over protesters and counter-protesters. Furthermore, Yiannopoulos was using the campus tours as a book promotion vehicle, in essence making his own profit from taxpayers' money. The Office of University Diversity and Inclusivity (OUDI) and the College of Liberal Arts created a counter-event – UNITE Cal Poly with speaker Kamau Bell - which successfully diverted attention from Yiannopoulos, but also cost the University valuable money.

In September of 2017, Milo Yiannopoulos' visit to the University of California Berkeley ended up costing approximately $800,000 for security, including police officers from eight law enforcement agencies and campuses across the state. UC Berkeley ended up spending nearly 4 million dollars for its "free speech week" in 2017. Furthermore, the university ended up incurring unreported damage costs wen counter-protestors destroyed university property.

In February of 2017, the Cal Poly Muslim Student Association (MSA) organized a conference with invited speakers. The University required MSA to pay $5,000 for security for the event, which it deemed "high risk." This apparent discrepancy in campus policy caused many to question what policy existed and how it was enforced.

The university's policies should be amended to institute responsible limits to the financial burden that the university is willing to pay to assist student clubs in inviting speakers. ~~not only equitable but also transparent and accountable~~. This resolution argues that a new policy be enacted to set a reasonable and equitable cap on expenses involved in security for speaker events. Where those fees exceed $5,000, the campus club(s) should be required to raise their own funding to cover these costs.

~~The University should require the same security fees from all student clubs. This is a need for transparency and equity.~~

1	WHEREAS,	Student clubs have invited speakers which have cost the university and the city
2		large sums of money for security; and
3		
4	WHEREAS,	Based on the experiences at other universities, the costs for such events could
5		become even higher than they have been at Cal Poly; and

6 WHEREAS,   ~~The University policy regarding paying for security for club-invited speakers has~~
7   ~~come into question in the past events; therefore be it~~
8
9 WHEREAS,   Decisions regarding paying for security for club-invited speakers at Cal Poly have
10   come into question in past events; therefore be it
11
12 RESOLVED: That the university shall not pay in excess of $5,000.00 for security for a ~~club-invited~~
13   speaker invited by a university recognized student club, per group, per academic
14.   year, and be it further
15
16 RESOLVED: That the student club(s) will be held responsible in advance for funding any amount
17   necessary in excess of $5,000.00 for security for invited speakers, and be it further
18
19 RESOLVED: That the University policy in this matter should be transparent and equitable.

Proposed by: Margaret Bodemer, Senator and
               Carrie Langner, Psychology and Child Development professor.
Date: April 18, 2018
Revised: May 14, 2018

Adopted: _____

ACADEMIC SENATE
Of
CALIFORNIA POLYTECHNIC STATE UNIVERSITY
San Luis Obispo, CA

AS-__-18

RESOLUTION ON MINORS

1 2 3 4	WHEREAS,	AS-775-14 defines a minor as a "coherent group of courses which stands alone and provides a student with broad knowledge of and competency in an area outside of the student's major"; and
5 6 7	WHEREAS,	A major and a minor may not be taken in the same degree program; and
8 9 10 11 12	WHEREAS,	AS-335-90/CC states that "The minor consists of 24 to 30 quarter units, of which at least half must be upper division. Twelve or more of the units in the minor must be specifies courses with the reminder, if any, to be chosen from an appropriate list."; and
13 14 15	WHEREAS,	Numerous resolutions outline requirements for minors and a single comprehensive policy would provide clarity; therefore be it
16 17 18 19	RESOLVED:	That the Academic Senate adopts the attached "Academic Program Review Policies and Procedures – Policy on Minors" superseding all prior policies regarding minors; and be it further
20 21 22 23	RESOLVED:	That, as part of this policy, the Academic Senate revise the unit range of minors from 24-30 quarter units (as defined in AS-73-79 and CAM 411) to 24-32 quarter units in order to accommodate more effectively 4-quarter-unit classes into minors.

Proposed by: Academic Senate Curriculum Committee
Date: May 7, 2018

POLICY ON MINORS

TOTAL UNITS AND GRADING CRITERIA

Resolutions AS-213-86 and AS-335-90 outline guidelines and criteria for minors. Because most classes have since migrated to 4 units, the upper limit for minors is increased from 30 to 32 quarter units. With regard to total units and grading, minors must meet the following:

- A minor consists of 24 to 32 units. At least half of the units must be from upper-division courses (300- or 400-level), and at least half of the units must be taken at Cal Poly (in residence). An exception is allowed for students earning a minor in French, German, Spanish, or Italian Studies who complete work toward that minor through study abroad; in these cases, at least a third of the units must be taken at Cal Poly (in residence).

- Not more than one-third of the courses in a minor can be graded Credit/No Credit (CR/NC), except for courses that have mandatory CR/NC grading.

- A minimum overall 2.0 GPA is required for completion of the minor.

MINOR SHOULD BE OUTSIDE THE MAJOR

As described in AS-775-14, a minor is defined as "coherent group of courses which stands alone and provides a student with broad knowledge of and competency in an area outside the student's major". As per AS-213-86, "in contrast to concentrations it stands alone and is distinct from and outside the student's degree major." For example, a major in Agricultural and Environmental Horticultural Sciences concentrating in Environmental Horticultural Science cannot obtain a Landscape Horticulture Minor but can obtain a Crop Science Minor.

A minor must require that students take a minimum of 12 units outside of their *specified* Major and Support courses (see definitions of Major Courses and Support Courses at the end of the document).

The 12 units (minimum) outside the *specified* Major or Support courses must be from

1. Free electives;
2. A list of designated electives, such as approved electives or technical electives;
3. General Education courses (as long as they are not specified as Major or Support Courses); and/or
4. Additional units that do not count towards the student's undergraduate degree requirements.

Majors in which the majority of requirements for a minor are embedded within the major and support courses shall not grant the minor to their students. The Academic Senate Curriculum Committee (ASCC) will review combinations of majors and minors to identify major-minor combinations where it is possible for students to earn both the major and the minor without

taking 12 units that are outside the major. If a minor is not sufficiently "outside the student's major", a note will be added to the catalog description of the minor indicating "Minor not open to students majoring in XXX."

MINOR IS COHERENT GROUP OF COURSES

The minor consists of 24 to 32 quarter units, of which, as per AS-213-86/CC, "at least half must be upper division. Twelve or more of the units in the minor must be specified courses with the remainder, if any, to be chosen from an appropriate list(s)". The specified units in a minor may include a choice of one course from a short list of courses that have similar content or course learning objectives. For example, the following requirement is consistent with the intent of this policy:

Select from the following (4 units): STAT 217, STAT 218, STAT 251.

The above list includes three introductory statistics courses that contain similar content but are offered for different majors. The ASCC would consider the 4 units in the above example to be specified.

AS-335-90 stipulates that "A proposal for a minor program be required to include a brief matrix of competencies provided by the minor correlated with the courses in the minor which will fulfill those competencies." Each minor should have a matrix of competencies that demonstrates the minor is a "coherent group of courses with a defined purpose or theme." During each program's periodic Program Review cycle, matrices for all minors in the program should be submitted to the ASCC for review. The matrix of competencies should map Minor Program Learning Objectives to courses within the minor such that no PLOs are unmet. Similarly, the required courses should all meet, at least in part, one or more of the PLOs. The matrix should be submitted by the beginning of the second week of Winter quarter during the review year.

Programs may request an exception to the requirement that at least 12 units in a minor be specified. Exception requests must be submitted to the ASCC and should include a written justification that demonstrates how the courses in the minor enable all students to achieve the minor's Program Learning Objectives. The ASCC will review exception requests in consultation with the Minor Program to ensure that the minor offers a "coherent group of courses with a defined purpose or theme."

MULTIPLE MINORS

A student may count a maximum of 8 units between any two minors.

PROGRAM REVIEW

Following what was in AS-335-90, Minor Program Review will be conducted during a department's Program Review. During review, the Minor Program Learning Objectives and Course Mapping should be confirmed and/or updated as appropriate.

NEW MINORS

Because minors increase student choice and do not pertain to degree requirements, a new minor may be proposed at any time. As per AS-213-86, new minors "require the same academic review process and justification in terms of purpose, resources, need, etc., as do concentrations."

New electives may be added to a minor at any time, but other changes may only occur during a catalog cycle.

DEFINITIONS

As stated in the Cal Poly catalog, Major Courses and Support Courses are defined as:

Major Courses

- comprise the basic knowledge in the discipline and are required of all students in the major;

- have the prefix of the major program and/or college; may be from any other prefix or discipline which are required in the major field of study;

- count toward the Major GPA; include common core courses that are at least half of the required number of units in the major;

- may be augmented by a concentration, minor or adviser approved electives;

- which fulfill General Education requirements shall be listed in the major course category with a reference (as an asterisk) to the GE area;

- should include 15 units designated at the 100-200 level.

Support Courses

- are any specified courses that are not listed in the major; do not carry the prefix of the home department, with the exception of advisor/technical/professional electives;

- are optional depending on the nature of the degree program and the judgment of the program's faculty;

- which fulfill General Education requirements shall be listed in the support course category with a reference (as an asterisk) to the GE area.