Meeting of the Academic Senate  
Tuesday, May 3, 2022  
3:10 to 5:00 pm  
https://calpoly.zoom.us/j/89778655368

I. Minutes: April 12, 2022 Minutes (pp. 2-3)

II. Communication(s) and Announcement(s):

III. Reports:
   A. Academic Senate Chair:
   B. Provost: (p. 4)
   C. Vice President for Student Affairs: (p. 5)
   D. Statewide Senate: None
   E. CFA: (p. 6)
   F. ASI: (p. 7)

IV. Special Reports:
   A. [TIME CERTAIN 3:30 p.m.] President’s Report: Jeff Armstrong, President

V. Consent Agenda:
   A. Department Modification Approval for the B.A. Political Science program with a 3+3 Pre-Law Option (pp. 8-16)
   B. Campus Specific Degree Title Change to plant Sciences (pp. 17-50)
   C. Agenda items approved by consent (pp. 51-52)

VI. Business Items:
   A. Resolution on UFPP 11.4.2 Departmental Role in the Selection Process for Chairs and Heads: Ken Brown, Academic Senate Faculty Affairs Committee Chair, first reading (pp. 53-64)
   B. Resolution on New Degree Program for Master of Science in Statistics: Andrew Schaffner, Statistics Department Chair, first reading (pp. 65-118)
   C. Resolution on AB 928 and Common GE Pathway: Gary Laver, Academic Senate General Education Governance Board Chair, first reading (pp. 119-121)
   D. Resolution on Scheduling of Online Assessments: John Hagen, Academic Senate Instruction Committee Chair, first reading (pp. 122-124)
   E. Resolution to Establish Semester Terms: Dustin Stegner, Academic Senate Ad Hoc Semester Conversion Committee Chair, first reading (pp. 125-133)
   F. Resolution on AB 928 and CSU Golden Four: Gary Laver, Academic Senate General Education Governance Board Chair, first reading (pp. 134-136)

VII. Discussion Item(s):

VIII. Adjournment:

805-756-1258 - academicsenate.calpoly.edu
I. Minutes: M/S/P to approve minutes from March 8, 2022.

II. Communication(s) and Announcement(s): None.

III. Reports:
A. Academic Senate Chair: Thomas Gutierrez, Academic Senate Chair, reported that the Senate’s Ad Hoc committee on semester conversion will have a resolution coming forward at next Senate meeting. He also announced that the Curriculum Appeals Committee has concluded that the GRC 377 is not approved as an area B UD course.
B. President’s Office: Jessica Darin, President’s Office representative, reported the Vice Chair of the CSU Board of Trustees visited last week. She will become the Board Chair. Additionally, on April 29, the CSU Trustee Student will meet with some members of the Executive Board.
C. Provost: Provost Cynthia Jackson-Elmoore announced that Amanda Lathrop, professor in the Food Science and Nutrition Department, is currently serving as an administrative faculty fellow for the graduate education; Amanda will assume the interim Dean role on June 13. She also reported that the National Survey of Student Engagement and the Faculty Survey of Student Engagement are currently being administered. Additionally, she mentioned that the PWSCUC team will be on campus from April 27 to April 29. More information about the visit can be found at the Cal Poly WASC website. Cal Poly was named a top producing institutional of Fulbright Scholars for 2021-22. Next week is national undergraduate research week.
D. Vice President for Student Affairs: Keith Humphrey, Vice President for Student Affairs, shared updates on the loss of Zachary Blanchard, and thanked the faculty who participated in polycultural weekend and open house. He also reported that the Student Diversity and Belonging Department will be holding a share-out session on Thursday. CHW will be dedicating a bench in memory of Cal Poly alum Davis Henegar.
E. Statewide Senate: Gary Laver, Statewide Senate representative, reported that that Rob Collins, Senate Chair, called on the ASCSU to continue the work on eliminating inequalities in the system, and that Dr. Jolene Koestar, former CSUN President, will become the new interim Chancellor. The ASCSU will have a draft transfer pathway May 6 complying with AB928. EVC Alva spoke to ASCSU on elimination of SAT/ACT for CSU admissions by BoT and wondered about future admissions formula. He also shared updates on the course equity portal and adopted Statewide Senate resolutions.
F. CFA: Lewis Call, CFA representative, reported that the faculty GSI raises have been implemented. See compensation history on the Cal Poly portal. SSI are currently being processed. Status of one-time bonus is unknown.
G. ASI: Tess Loarie, ASI representative, sent a written report that the Student Success Fee Committee met to establish student priorities for the year, and that the ASI officers agreed to allocate 10k from the DEI student government training line item to Social Justice Funding. The Cal Poly Opportunity Fee Committee will be meeting again to prepare and approve proposals. Second Round interviews for the ASI executive direction position concluded.

IV. Special Reports:
A. Faculty Affairs Update: Ken Brown, Academic Senate Faculty Affairs Committee Chair, gave a presentation regarding data about student evaluation response rates. This presentation can be found at the following link: https://content-calpoly-edu.s3.amazonaws.com/academicsenate/1/images/sa041222.pdf
B. Library Annual WRITTEN Update: Adriana Popescu, Dean of the Library, submitted a written report on annual library updates. The report can be found at the following link: https://content-calpoly-edu.s3.amazonaws.com/academicsenate/1/images/sa041222.pdf

805-756-1258 - academicsenate.calpoly.edu
V. **Consent Agenda:**
A. Agenda items have been approved by consent and can be found at the following link: https://content-calpoly-edu.s3.amazonaws.com/academicsenate/1/images/sa041222.pdf

VI. **Business Items:**
A. **Resolution on UFPP 11.4.2 Departmental Role in the Selection Process for Chairs and Heads:** Ken Brown, Academic Senate Faculty Affairs Committee Chair, introduced in first reading a resolution on UFPP 11.4.2 Departmental Role in the Selection Process for Chairs and Heads. This resolution centers around the way in which departments advise deans in the dean’s appointment of a chair or head, and takes existing policy and places it in UFPP. This resolution will return in first reading at the next Academic Senate meeting.

B. **Resolution on Scheduling of Online Assessments:** John Hagen, Academic Senate Instruction Committee Chair, introduced in first reading a Resolution on Scheduling of Online Assessments. This resolution suggests guidance on the availability window of online assignments. This resolution will return in first reading at the next Academic Senate meeting.

C. **Resolution on New Degree Program for Master of Science in Statistics:** Andrew Schaffner, Statistics Department Chair, presented a slide presentation on a Resolution in New Degree Program for Master of Science in Statistics. This presentation can be found at the following link: https://content-calpoly-edu.s3.amazonaws.com/academicsenate/1/images/sa041222.pdf This resolution will return in first reading at the next Academic Senate meeting.

D. **Resolution on AB 928 and Common GE Pathway:** Gary Laver, Academic Senate General Education Governance Board Chair, introduced in first reading a Resolution on AB 928 and Common GE Pathway. This resolution recommends flexibility in how AB 928. This resolution will return in first reading at the next Academic Senate meeting.

VII. **Discussion Item(s):** None.

VIII. **Adjournment:** This meeting was adjourned at 4:44.

Minutes submitted by

[Signature]
Shefali Mistry
WSCUC Campus Visit
Thank you to all who participated in the WASC Senior College and University Commission (WSCUC) campus visit April 27-29. We appreciate the campus community welcoming the WSCUC team and for taking time to engage with them. The team report and recommendation will be reviewed on June 22-23, 2022, at which time a decision will be made on the university’s accreditation.

Vice President for Research, Economic Development, and Graduate Education Search
The national search for the next vice president for Research, Economic Development, and Graduate Education (R-EDGE) is ongoing. We are working with a search firm, Isaacson Miller. First round interviews took place the week of April 18 and we expect campus visits to occur in mid-May. We hope to complete this recruitment in June.

Faculty Awards
Thank you to the members of the Distinguished Scholarship Awards Committee and the Distinguished Teaching Awards Committee for their work in evaluating and recommending awardees for these honors. In addition, thank you to the Outstanding Faculty Advisor Award Committee for their work in soliciting nominations and recommending an awardee for the Outstanding Faculty Advisor award.

Distinguished Scholarship Awards Committee members: Alex Ameri, Bridget Benson, Leyla Cebugos, Richard Cobb, Marirose Evenden, Todd Hagobian, Steve Hamilton, Stacy Kolegraff, James Tejani, Lars Tomanek

Distinguished Teaching Awards Committee members: Sarah Banholzer, Dale Clifford, Ann De Lay, Eric Kantorowski, Elena Keeling, Brian Kennelly, Andrew Kim, Anurag Pande

Outstanding Faculty Advisor Award Committee members: Cathy Bartholomew, Catherine Kleier, Alec Koehler, Silvia Marijuan, Beth Merritt Miller, Kate Murphy, Kellina Tran, Shelly Wolf

Students Competing at CSU Grad Slam Thesis Competition
Two graduate students, Jacob Campbell, from the Higher Education Counseling and Student Affairs Program, and Savannah Weaver, from the Biology program, will be representing Cal Poly at the CSU Grad Slam on May 6, 2022. Hosted virtually by CSU Bakersfield, Grad Slam is a fast-paced and exciting event in which graduate students present their research, scholarship, and creativity in just three minutes or less. Each of 20 campuses will send two students on to the statewide CSU competition, where they will present their work live for a chance to win one of three possible prizes. If you are interested and able to attend, you can find registration at the link provided. Help us celebrate our amazing Cal Poly students as they compete on May 6.
Here are some great numbers about job postings at Career Services:

- The March job posting total of 11,611 is highest total postings in a single month we’ve ever seen, breaking the record set in January by over 2,000 job postings!
- The March 2022 job posting total of 11,611 is a 118% increase from the March 2021 total of 5,320.
- The March 2022 job posting total of 11,611 is a 23% increase from the February 2022 total of 9,450.

**March 2022 totals by Job Type**

- Career: 7,963
- Intern/Seasonal: 2,934
- Local Part-time: 339
- On-Campus Student Employment: 39
- Fellowship: 219
- Co-op: 94
- Experiential Learning: 23

Student Diversity and Belonging announced the location for the new Latinx Center – opening this Fall in Building 52 (in the current Center for Service in Action space). Additionally, the Pride Center will be moving to the MCC Hub and related space in the UU and the Men and Masculinities Program will be moving to the former Pride Center space. Student Affairs is excited about these expanded spaces for our students!

Commencement is a little more than a month away! Details about the official university ceremonies as well as college/department/cultural events are available online at commencement.calpoly.edu. We look forward to seeing you at this celebration of our student’s achievements.

Congratulations to Gracia Babatola on being elected the 2022-23 ASI President!
CFA Report to the Academic Senate – May 3, 2022

The University has paid this year's General Salary Increase for faculty. Faculty should have received a lump sum payment for this year's 4% GSI, retroactive to July 1, 2021. The ongoing 4% GSI should be reflected in future paychecks / direct deposits starting May 1, 2022.

The University has also paid the one-time bonus for faculty. The bonus was paid to faculty who were on active pay status when our new CBA was ratified (February 3, 2022). The amount of each faculty member’s bonus was based on their timebase during the 2020-21 academic year. Faculty who were full time during the 2020-21 AY should have received $3500; for faculty who worked part time last year, the bonus was prorated by their 2020-21 timebase. The bonus is considered taxable income and is subject to tax withholding.

Some faculty who are eligible for Service Salary Increases may see their SSIs in early May. The University expects to finish processing SSIs for all eligible faculty by the end of May. Faculty who are eligible for the Service Salary Increase will be receiving a lump sum payment for the 2.65% SSI, retroactive to the faculty member's anniversary date (date of hire). The ongoing 2.65% SSI will then be reflected in future paychecks / direct deposits.

Faculty can see their new salaries by checking their compensation history at My Cal Poly Portal > Personal Info > My Job Info > View Compensation History.

Any faculty members who have questions about their raises should contact Academic Personnel.
• The CPOF committee meets 4/29 to vote on the allocation of this year's funding
• The SSFAC meets around May 11th to begin reviewing proposals. Proposals from senior leaders are due 4/29, and the committee will be sent information late next week about next steps.
• ASI allocation 3K to the Illuminate Showcase and 1.5K to the Ruby Ibarra performance for APIDA heritage month from Social Justice Program Funding
• The ASI Survey closed with over 1,000 student responses. Focus groups for the qualitative portion of the assessment will be happening the week of May 16th.
• Last night, the ASI Board of Directors unanimously voted to approve Michelle Crawford as the new Executive Director. An offer will be made pending a background check, and a press release will follow if she chooses to accept the position.
• ASI election results are out and Gracie Babatola will be the next ASI President. Additionally, Jacob Schlottmann-McGonigle was elected to chair the University Union Advisory Board next year. Chair elections will be May 25th for the ASI Board of Directors. A full list of elected BOD members can be found here: https://www.asi.calpoly.edu/asi-now/asi-blog/meet-your-2022-23-asi-president-asi-board-of-directors/
The B.A. Political Science program within the College of Liberal Arts (CLA) is proposing a 3+3 Pre-Law Option to be operated in partnership with the University of California Hastings College of Law. This program modification will establish an accelerated path through which Political Science students can earn both their Bachelor of Arts and Juris Doctor degrees in six years, rather than the usual seven. Students participating in the Pre-Law 3+3 B.A./J.D. option will have their first year of law school coursework count towards completing some of the course requirements for their Political Science undergraduate degree at Cal Poly (no more than 25% of their undergraduate degree). This option would be administratively tracked by the CSU through the degree database as a “concentration” (lacking no other means of tracking it).

Please see the attached PDF which contains the following:

1. Proposal for a Pre-Law (3+3 Option) B.A./J.D., pages 1-6
2. Campus approvals, page 7
# Pre-Law (3+3 Option) Concentration Proposal

**3/16/2022**

**TO:** Cynthia Jackson-Elmoore, Provost and Executive Vice President  
Bruno Giberti, Associate Vice Provost for Academic Programs and Planning

**FROM:** Anika Leithner and Philip Williams

**COPIES:** Philip Williams, Jennifer Teramoto Pedrotti

**SUBJECT:** Proposal for New Pre-Law (3+3 Option) Concentration

## Summary

<table>
<thead>
<tr>
<th>Cal Poly Degree Designation and Title</th>
<th>B.A. Political Science</th>
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<tbody>
<tr>
<td>Partner Institution</td>
<td>University of California Hastings College of Law</td>
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<tr>
<td>Partner Institution Degree Designation and Title</td>
<td>J.D. Law</td>
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<tr>
<td>Proposed Start Term and Year</td>
<td>Fall 2022</td>
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<td>Cal Poly College</td>
<td>College of Liberal Arts</td>
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<tr>
<td>Cal Poly Department</td>
<td>Political Science</td>
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</tbody>
</table>
| Contact Name(s) and Email(s) of Proposer(s) | Philip Williams, Dean ([pjw@calpoly.edu](mailto:pjw@calpoly.edu))  
Anika Leithner, Chair ([aleithne@calpoly.edu](mailto:aleithne@calpoly.edu)) |
Cal Poly – UC Hastings College of Law Articulation for a Pre-Law 3+3 B.A./J.D. Concentration

**Purpose and Characteristics of the Proposed Program**

California Polytechnic State University, San Luis Obispo is partnering with the University of California Hastings College of the Law to establish an accelerated degree program through which Political Science students can earn both their Bachelor of Arts and Juris Doctor degrees in six years, rather than the usual seven. Students participating in the Pre-Law 3+3 B.A./J.D. Concentration will have their first year of law school coursework count towards completing some of the course requirements for their undergraduate degree at Cal Poly (no more than 25% of their undergraduate degree). Based on the high quality and performance of Cal Poly students already pursuing the traditional J.D. pathway at Hastings, UC Hastings leadership reached out to Cal Poly to explore the possibility of developing an accelerated program for high-achieving Cal Poly students each year. These 3+3 programs are becoming increasingly common around the country. Within the CSU, CSU-Dominguez Hills and CSU Northridge campuses both have articulations for 3+3 B.A./J.D. programs with Southwestern Law School.

**Key Program Features**

- Students earn a law degree (Juris Doctor) in a total of six years (three years undergraduate and three years in law school).
- Students save one year’s worth of undergraduate tuition and living expenses while gaining a head start in entering the legal profession.
- Credits earned in the first year of law school apply toward the BA degree.

The Pre-Law 3+3 B.A./J.D. Concentration will only be open to those applicants who enter Cal Poly as freshmen and complete all three years of their undergraduate work at Cal Poly. Students participating in the Pre-Law 3+3 B.A./J.D. Concentration will be enrolled in the Political Science degree program at Cal Poly for the first three years of the Program, and will be considered full-time students of Cal Poly and will be subject to the policies and procedures of Cal Poly.

Upon matriculation at UC Hastings through this Pre-Law 3+3 B.A./J.D. Concentration, students are considered full-time students of UC Hastings Law, and will be subject to the policies and procedures of UC Hastings Law. Students will be considered for financial aid during the application process with UC Hastings Law to the same extent as students at UC Hastings Law who are not participating in the accelerated J.D. Program.

UC Hastings Law shall, in accordance with applicable laws, notify Cal Poly at the end of each academic year of the students in the Pre-Law 3+3 B.A./ J.D. Concentration who have successfully completed their first year of full-time study at UC Hastings Law and will send an official transcript recording that first year of study to Cal Poly. Upon receipt of the transcript, Cal Poly shall award those students their bachelor’s degree in accordance with Cal Poly’s standard procedures.

UC Hastings Law will vet candidates for the program pursuant to its usual admissions standards and will determine whether to admit them in its sole discretion.

Students who successfully earn a JD at UC Hastings Law will receive the degree from UC Hastings. The UC Hastings Law degree is separately conferred by UC Hastings Law, not jointly with Cal Poly. The Cal Poly degree is separately conferred by Cal Poly, not jointly with UC Hastings Law. Cal Poly will award the
baccalaureate degree to students after successful completion of the first year at UC Hastings Law and in accordance with Cal Poly’s standard graduation criteria.

Accreditation

The University of California Hastings College of the Law is an American Bar Association-approved law school and is accredited by the Accrediting Commission for Senior Colleges and Universities of the Western Association of Schools and Colleges. UC Hastings is also a member of The Association of American Law Schools.

Proposed MOU (Attached)

Curriculum Flowchart and Narrative

<table>
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<tr>
<th>First Year</th>
<th>Second Year</th>
<th>Third Year</th>
<th>Hastings Credit</th>
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<tr>
<td>Fall</td>
<td>Winter</td>
<td>Spring</td>
<td>Fall</td>
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<tr>
<td>POLS 112 or AP Credit (4) [D1]</td>
<td>POLS 225 (4)</td>
<td>POLS 230 (4)</td>
<td>POLS UDE (4)</td>
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<td>POLS 180 (4)</td>
<td>STAT 217 (4) [B4]</td>
<td>POLS DEI Course (POLS 308, 310, 343, 380, 417, 419, 445, 457, 459) (4)</td>
<td>POLS 461/462 (4)</td>
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<td>POLS 229 (4)</td>
<td>ENGL 133/134 (4) [A2]</td>
<td>GE (4)</td>
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<td>COMS 101/102 (4) [A1]</td>
<td>Support Course (ANT 201, GEOG 150, HIST 110, 111, 222, or 223, SOC 110) (4)</td>
<td>GE (4)</td>
<td>GE (4)</td>
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<td>Any 200- or 300-level ES or WGS (4)</td>
<td>COMS 126, COMS/ENGL 145, ENGL 148, PHIL 126 (4) [A3]</td>
<td>Graduate Writing Requirement</td>
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<td>GE (4)</td>
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16 16 14 14 16 14 14 16 44
48 44 46 44

180 Units

Major Courses (44 at CP, 8 at H)  Support Courses (12 at CP)  GE Courses (72 at CP, of which 8 in major)  Concentration (16 at CP, 12 at H)  Free Electives (24 at H)
Cal Poly students participating in the Pre-Law 3+3 B.A./J.D. Concentration with Hastings will receive credit for the equivalent of 44 quarter units at Cal Poly during their first year in law school. Twelve of those units will be applied to a student’s pre-law concentration (out of 28 total), 8 units will be applied to a student’s upper-division electives (out of 20 total), and 24 units will go toward a student’s free electives (out of 24 total). Pursuing this 3+3 program does not significantly impact the total number of units a student is expected to complete each quarter at Cal Poly, which still ranges between 14 and 16 units per quarter. The only difference will be the types of courses a student completes. For instance, instead of pursuing free electives in their third year, 3+3 students would be expected to finish up their remaining GE requirements at Cal Poly. Similarly, students would complete fewer concentration and upper-division major courses in their third year (giving them room for GE requirements).

A slightly larger departure from the regular B.A. program is the fact that 3+3 students would enroll in their senior projects in their last quarter at Cal Poly, which is spring quarter of their third year.

During their first year at UC Hastings, Cal Poly students would receive “placeholder” units on their Cal Poly transcripts similar to study abroad students, which allows those students to remain affiliated with Cal Poly while they wait for their Bachelor’s degree to be awarded. This also provides students with the ability to return to Cal Poly to complete their degree requirements without having to reapply in the event that they fail to complete their first year of law school.

Degree completion

To receive their Cal Poly B.A. degree, students will have to demonstrate that they have completed all of their undergraduate requirements by the end of their first year at Hastings.

Senior Project Requirement

Cal Poly students will enroll in POLS 461 and POLS 462 with a political science advisor in spring quarter of their third year. Students will work with their advisors to develop the framework of a suitable project that meets Cal Poly and departmental standards. If necessary, an “I” (Incomplete) grade can be awarded, allowing students to complete work during the summer before their first year at UC Hastings.

While students are required to have “senior standing” before beginning their senior project, many of our students are eligible to do so by spring quarter of their third year as a result of having completed enough overall units toward their degree. In the case of advanced undergraduates who are close to senior standing who wish to embark on their capstone project before their fourth year, the Political Science department has always made exceptions on a case-by-case basis (e.g. for students collecting data for their project while studying abroad or completing an internship). A similar exception can be made for 3+3 students. Faculty will advise students on the timeline of completion for required preparatory courses for senior project (POLS 359 and POLS 361), which is also reflected in the proposed flowchart. POLS 359 should be taken prior to senior project while POLS 361 can be taken concurrently with instructor consent. 3+3 students can choose to finish POLS 461 and POLS 462 in a single quarter or they can complete POLS 461 in spring quarter and POLS 462 during the summer before they enroll at Hastings. “I” grades are designed to allow students flexibility with their research projects and are eligible to be used here.

Residency Requirement
We are requesting that Cal Poly waive the requirement that 28 units in residence of the last 40 units counted toward the degree. The essence of the 3+3 program (as with the Animal Sciences/Veterinary Medicine 3+2 programs) is that the first year of law school count towards the completion of their remaining undergraduate degree requirements as detailed above. President Armstrong and Provost Jackson-Elmore strongly support waiving the residency requirement for the limited number of student who will be pursuing this program.

Application Process

Cal Poly has agreed to implement the following plan to carry out the accelerated program:

- Cal Poly will develop Pre-Law recruiting materials (e.g., web content, print pieces, etc.) and list the affiliation with UC Hastings Law. Prior to dissemination, Cal Poly shall provide UC Hastings Law with a copy of such recruiting materials for review and comment as to the description of the affiliation.
- Cal Poly will advise qualified students about the opportunity to apply for and the benefits of the Pre-Law 3+3 B.A./J.D. Concentration. To be considered, qualified students will need to have a minimum higher education GPA of 3.3. The timing of courses POLS students are expected to take during their first two years in the program does not differ between traditional students and prospective 3+3 program students. While the POLS department will advertise the 3+3 opportunity to students during their first year, it is more important that students enter their third year at Cal Poly with a thorough understanding of which courses they will need to complete before being eligible to enroll at Hastings. Advising will reflect this timeline and intensify efforts to communicate with students during their second year at Cal Poly to ensure eligible candidates are aware of and meet the expected requirements.
- A pre-screening committee comprised of Cal Poly pre-law faculty in the Political Science department will select students to recommend to Hastings based on the following criteria:
  - Minimum 3.3 GPA
  - Pre-law concentration
  - On path to complete all POLS degree requirements outlined in the flowchart by the end of their third year
- As part of their overall recruitment efforts, Cal Poly will engage in targeted outreach to underrepresented minorities in the department.
- Cal Poly will send the list of interested and pre-selected pre-law students who will meet Cal Poly’s graduation requirement with only one additional year as a UC Hastings Law first-year student AND who meet the 3.3 GPA requirement to the Director of Admissions at UC Hastings Law by October 31 of the year prior to anticipated matriculation at UC Hastings Law.

Acceptance Criteria

Cal Poly will use its current admissions criteria and policies to accept students into the Political Science major. UC Hastings Law will vet candidates for the 3+3 program pursuant to its usual admissions standards and will determine whether to admit them in its sole discretion.

Expected Student Demand
<table>
<thead>
<tr>
<th></th>
<th>At Initiation</th>
<th>After 3 Years</th>
<th>After 5 Years</th>
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<tr>
<td>Number of Majors</td>
<td>1-3</td>
<td>3-5</td>
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<tr>
<td>(Annual)</td>
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<td>Number of Graduates</td>
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<td>1-3</td>
<td>3-5</td>
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<td>(Cumulative)</td>
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<td>Source of data</td>
<td>Based on informal survey of pre-law students and Hastings experience with other 3+3 programs</td>
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**Meeting Demand**

Given the small number of students involved, the department does not foresee any issues in meeting the anticipated demand. No additional coursework will be required of students before admission to the program. Students will be advised that by the end of their third year they will need to complete all but 20 units of the Political Science degree requirements and all but 24 units of their overall graduation requirements.

**Expected Impact on Department**

We do not foresee any significant impact on the department in terms of advising resources, budget or course offerings.
Signatures
We all confirm that the proposed pre-law 3+3 concentration aligns with the mission and strategic plan for the department, college, and university.

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<thead>
<tr>
<th>Name</th>
<th>Position</th>
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<tbody>
<tr>
<td>Shelley Hurt</td>
<td>Department Curriculum Committee Chair</td>
<td>03/16/2022</td>
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<tr>
<td>Anika Leithner</td>
<td>Department Chair/Head</td>
<td>03/16/2022</td>
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<tr>
<td>Christian Anderson</td>
<td>College Curriculum Committee Chair</td>
<td>03/16/2022</td>
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<tr>
<td>Philip Williams</td>
<td>Dean, College of Liberal Arts</td>
<td>03/16/2022</td>
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<tr>
<td>Gregory Bohr</td>
<td>Academic Senate Curriculum Committee Chair</td>
<td>03/16/2022</td>
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<tr>
<td>Bruno Giberti</td>
<td>Associate Vice Provost for Academic Programs and Planning</td>
<td>03/21/2022</td>
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This proposal was approved by the Academic Senate via the consent agenda on _______. The signatures below represent campus support of this proposal.

<table>
<thead>
<tr>
<th>Name</th>
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<tbody>
<tr>
<td>Thomas D. Gutierrez, Chair, Academic Senate</td>
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<tr>
<td>Cynthia Jackson-Elmoore, Provost and Executive Vice President for Academic Affairs</td>
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<td>Jeffrey D. Armstrong, President</td>
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The Agricultural and Environmental Plant Science (AEPS) program is proposing a campus specific degree title change to Plant Sciences (PLSC). Please see the attached PDF which contains the following:

1. Proposal for Campus Specific Degree Title Change, pages 1-8
2. Appendix A: Supporting Data, pages 9-16
3. Appendix B: Existing and Proposed Course Requirements Details, pages 17-30
DEGREE MODIFICATION
Degree Title Change

<table>
<thead>
<tr>
<th>Existing</th>
<th>Revised</th>
</tr>
</thead>
<tbody>
<tr>
<td>Degree Designation (e.g., BA, MS, etc.)</td>
<td>BS</td>
</tr>
<tr>
<td>Campus Specific Degree Title</td>
<td>Agricultural and Environmental Plant Sciences</td>
</tr>
<tr>
<td>CSU Degree Title</td>
<td>Agronomy, Crop Science</td>
</tr>
<tr>
<td>CIP Code</td>
<td>01.1102</td>
</tr>
<tr>
<td>Start Term</td>
<td>Fall 2022</td>
</tr>
<tr>
<td>College</td>
<td>CAFES</td>
</tr>
<tr>
<td>Department</td>
<td>Horticulture and Crop Science (in the process of being changed to Plant Sciences)</td>
</tr>
<tr>
<td>Contact Name(s) and Email(s)</td>
<td>Scott Steinmaus, PhD, <a href="mailto:ssteinma@calpoly.edu">ssteinma@calpoly.edu</a></td>
</tr>
<tr>
<td>Proposal Date</td>
<td>January 17, 2022</td>
</tr>
</tbody>
</table>

Upon completion of this form, please submit it for preliminary review by the college and by the Office of Academic Programs and Planning. The proposal can then be submitted to the department, college, and senate curriculum committees before being circulated for approval signatures as indicated at the end of the form.

Proposal elements:

1. **What is the rationale for the proposed modification? (This may address disciplinary convention, recruitment issues, employer concerns/applicable workforce demand issues, or titles used at other CSU campuses or at public or private institutions across the country.)**

   Our curriculum is designed to train Plant Scientists who use their education to make informed decisions regarding sustainable farming or horticultural practices that maximize plant production while minimizing economic, environmental and social impacts. They are “service” providers who are managers themselves or provide recommendations to top managers in the areas of plant breeding and physiology, soil and growth media fertility, and pest management. Their job duties require that they balance time outdoors or in controlled plant growth environments as well as indoors in a laboratory or office. The US Bureau of Labor Statistics (USBLS) does not have a single category of occupation that captures exactly the predominant occupations of our graduates. The occupations of our graduates lie between the categories, “Soil and Plant Scientists” and “Farmers, Ranchers and Other Agricultural Managers” (see Appendix A).

   As the latest available US Bureau of Labor Statistics (USBLS) indicates for top-employing occupations for workers with an agricultural degree, we should be emphasizing the “science” component of the program as those occupations (e.g. Plant and Soil Sciences) have a projected 7% increase in demand for 2019-2029, and these occupations require a Bachelor’s degree (Table 1). On the other hand, some occupations described as “agriculture” (e.g. certain farm and ranch occupations) have a 6% decrease in demand projected for the same time period and only require a high school diploma (Table 1). Graduates of our program earn a Bachelor’s
degree that prepares them for careers in the plant sciences, not jobs in agricultural labor that only require a high school diploma. Furthermore, during student recruiting sessions with high school students across the state, the single most common question from those students was whether they needed an agricultural background to fit into our program. In a recent survey of first year students in our AEPS 101 Orientation class, nearly 50% of the respondents said they did not come from an agricultural background.

The search term “plant science” has been shown to be a more common search term (keyword) than “agronomy” or “agricultural science” according to a recent assessment performed by Hanover Research Associates (Figure 1). We have seriously considered Hanover’s highest ranked search term “environmental science” with a proposed department and program name such as, “environmental plant science”. This term puts a primary focus on natural ecosystems, and although we do cover some topics in these systems, it is not our primary focus. For example, habitat restoration or wildland conservation is covered as it pertains to the agricultural and natural interface and the quantification of ecosystems services now available to growers (https://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/technical/emkts/?cid=nrcseprd1396024). However, the term, “environmental plant sciences” alone would be confusing at best and misleading at worst, because it does not capture our agricultural and horticultural emphases. The name “Plant Biology” or “Botany” most often refers to programs that are focused on more basic plant research such as molecular biology, anatomy, taxonomy, evolution, and morphology. Even though we also include basic research in our curriculum, the terms “biology” and “botany” are misleading because they do not capture the more “applied” aspects of how we train our students.

The Hanover report confirms, for the most part, the trends indicated by the data from the USBLS. Occupations our graduates obtain are “services-based” in nature and provide expert recommendations to those directly growing food and ornamental plants. For example, our graduates are frequently employed as Pest Control Advisors and Certified Crop Advisors among other “services-based” occupations (Table 2). The occupations specify an educational level that most frequently requires a Bachelor’s degree, as indicated in the parentheses next to each education level (Table 2). The Hanover Report found that many programs that teach a similar curriculum from around the country are named or contain the name, “Plant Sciences”. Our own assessment of all college-level programs in the country that teach a similar curriculum to ours found 56% of programs with the term “Plant Sciences” in their name. Key institutions we consider “peer” institutions whose program names are, or include the name “Plant Sciences” include Cal Poly Pomona, CSU Chico, and CSU Fresno (Table 3). Universities whose programs we might consider “aspirational” with the “Plant Sciences” name include Cornell University, UC Davis, UC Santa Cruz, Purdue University, and many others (data available upon request.)

Table 1. Top-employing occupations for workers with an agricultural degree (Source: US Bureau of Labor Statistics Employment Projections Program and U.S. Census Bureau American Community Survey 2021)
The U.S. Bureau of Labor Statistics (BLS) projects employment and designates education typical for entry in about 800 detailed occupations. Table 2 shows projections data and typical education for occupations in which people with this degree were employed. It also shows the percentage of bachelor’s degree holders in this field who were employed in the occupation and the percentage of workers in the occupation with an advanced degree in any field.

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Percent growth, projected 2019–29</th>
<th>Typical entry-level education</th>
<th>Percent degree holders in this field, this occupation, 2018</th>
<th>Percent of this occupation with an advanced degree, 2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health specialties teachers, postsecondary</td>
<td>21</td>
<td>Doctoral or professional degree</td>
<td>2</td>
<td>74</td>
</tr>
<tr>
<td>Veterinarians</td>
<td>18</td>
<td>Doctoral or professional degree</td>
<td>4</td>
<td>100</td>
</tr>
<tr>
<td>Soil and plant scientists</td>
<td>7</td>
<td>Bachelor’s degree</td>
<td>2</td>
<td>38</td>
</tr>
<tr>
<td>Elementary school teachers, except special education</td>
<td>4</td>
<td>Bachelor’s degree</td>
<td>3</td>
<td>50</td>
</tr>
<tr>
<td>Farmworkers and laborers, crop, nursery, and greenhouse</td>
<td>4</td>
<td>No formal educational credential</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Sales representatives, wholesale and manufacturing, except technical and scientific products</td>
<td>1</td>
<td>High school diploma or equivalent</td>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td>Retail salespersons</td>
<td>-1</td>
<td>No formal educational credential</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Personal service managers, all other entertainment and recreation managers, except gambling, and managers, all other</td>
<td>-2</td>
<td>Bachelor’s degree</td>
<td>4</td>
<td>21</td>
</tr>
<tr>
<td>First-line supervisors of retail sales workers</td>
<td>-5</td>
<td>High school diploma or equivalent</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>Farmers, ranchers, and other agricultural managers</td>
<td>-6</td>
<td>High school diploma or equivalent</td>
<td>9</td>
<td>4</td>
</tr>
</tbody>
</table>

Note: Occupational profiles may comprise multiple SOC occupations, which may have differing education categories.

Source: U.S. Bureau of Labor Statistics, Employment Projections program (projected growth, entry-level education) and U.S. Census Bureau, American Community Survey (degree holders, advanced degrees).
Figure 1. Search Engine Key Word Analysis. (Source: Hanover Research. Higher Education Market Analysis, Bachelor’s in Agricultural and Environmental Plant Sciences Prepared for California Polytechnic State University_San Luis Obispo. October 2021 page 5)

**Agriculture and Environmental Plant Sciences-Related Search Engine Analytics**

Agricultural and environmental plant sciences-related priority metrics and Google search trends over the past 12 months:

- **High Demand**
  - Overall Priority Score: 57
  - Average Volume: 35,451
  - Difficulty Index Score: 52
  - Organic CTR: 64

- **Low Demand**
  - Overall Priority Score: 80
  - Average Volume: 100
  - Difficulty Index Score: 100
  - Organic CTR: 100

Average demand score based on search engine volume, difficulty score, and organic CTR; note that a priority score of 80 or above is considered "high demand." Average monthly volume of Google searches for agricultural and environmental plant sciences-related programs, with a total range of 101,000 – 70,000 over the past 12 months. Average keyword difficulty index, an estimation of how easy (or difficult) it is to rank more highly than competitors on the first page of search results. Average organic click-through-rate (CTR), an estimate of the percentage of clicks available to traditional, organic links on the search engine results page (SERP).

**Search Interest Index Over Time**

Relative agricultural and environmental plant sciences-related search interest volume by keyword/phrase over the past five years.

Note: For this analysis, Hanover retrieved search engine analytics data from Moz.com, a proprietary search engine optimization (SEO) firm. These data reflect the "actual" average keyword search volume in the United States over the past 12 months as of September 2021. Hanover supplements this data with Google Trends' "interest over time" metric, where "numbers represent search interest relative to the highest point on the chart for the given region and time." A value of 0-100 is the peak popularity for the term. Note that Google search trends use a "rounded" average and should be considered with caution.

**Table 2. Real-Time Job Postings Intelligence**

(Source: Hanover Research. Higher Education Market Analysis, Bachelor’s in Agricultural and Environmental Plant Sciences Prepared for California Polytechnic State University_San Luis Obispo. October 2021, page 10)

<table>
<thead>
<tr>
<th>Keyword Job Search</th>
<th>Top 5 Certifications</th>
<th>Top 5 Job Titles</th>
<th>Education Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pest Control Advisor (55 postings)</td>
<td>Driver’s License (8)</td>
<td>Pest Control Advisor (7)</td>
<td>High School Diploma/equivalent (3)</td>
</tr>
<tr>
<td>Certified Crop Advisor (17 postings)</td>
<td>Certified Crop Advisor (10)</td>
<td>Crop Consultant/PCA (2)</td>
<td>Associate’s degree (6)</td>
</tr>
<tr>
<td>Plant Protection (68 postings)</td>
<td>Driver’s license (9)</td>
<td>Certified응 Pesticide Applicator (1)</td>
<td>Bachelor’s degree (10)</td>
</tr>
<tr>
<td>Farm Management (222 postings)</td>
<td>Driver’s license (28)</td>
<td>Certified Crop Manager (CEM) (5)</td>
<td>Bachelor’s degree (15)</td>
</tr>
</tbody>
</table>

Note: For this analysis, Hanover retrieved job postings data for agricultural and environmental plant sciences-related positions in California from Indeed, a proprietary database providing real-time job postings aggregated from thousands of websites. All data reflect the 30-day period as of September 2021.

**Table 3. Program Benchmarking**

(Source: Hanover Research. Higher Education Market Analysis, Bachelor’s in Agricultural and Environmental Plant Sciences Prepared for California Polytechnic State University_San Luis Obispo. October 2021, page 13)

<table>
<thead>
<tr>
<th>Academic Program</th>
<th>GPA</th>
<th>Graduation Rate</th>
<th>Employment Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental Science</td>
<td>3.5</td>
<td>90%</td>
<td>85%</td>
</tr>
<tr>
<td>Agriculture Science</td>
<td>3.7</td>
<td>85%</td>
<td>90%</td>
</tr>
<tr>
<td>Plant Science</td>
<td>3.4</td>
<td>80%</td>
<td>75%</td>
</tr>
<tr>
<td>Soil Science</td>
<td>3.6</td>
<td>95%</td>
<td>90%</td>
</tr>
</tbody>
</table>

Note: Program benchmarking data reflects the academic performance, graduation rate, and employment rate for students enrolled in various programs at the university. Data is compiled from institutional records and external surveys conducted during the academic year 2021-2022.
2. **Cal Poly degree requirements:**

The core course requirements for the Proposed Plant Sciences curriculum and the existing AEPS Program can be found in Table 4. They are identical, as we are not proposing to change any course requirements. Therefore, Support Courses, Advisor-Approved Electives or Concentration courses are not listed here but can be found in Appendix B and at:

https://catalog.calpoly.edu/collegesandprograms/collegeofagriculturefoodenvironmentalsciences/horticulturecrops/bsagriculturalandenvironmentalplantsciences/index.html

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**Table 4.** Comparison of core coursework of the proposed Plant Sciences Program and existing Agricultural and Environmental Plant Science Program (4a). Units associated with support, concentration, and approved/free electives (4b). Units are quarter units.
(a.) Proposed and Existing Core Courses

<table>
<thead>
<tr>
<th>Proposed Plant Sciences Program</th>
<th>Units</th>
<th>Existing AEPS Program</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLS 101 Orientation to Horticulture and Crop Science</td>
<td>1</td>
<td>AEPS 101 Orientation to Horticulture and Crop Science</td>
<td>1</td>
</tr>
<tr>
<td>PLS 120 Principles of Horticulture and Crop Science</td>
<td>4</td>
<td>AEPS 120 Principles of Horticulture and Crop Science</td>
<td>4</td>
</tr>
<tr>
<td>PLS 124 Plant Propagation</td>
<td>4</td>
<td>AEPS 124 Plant Propagation</td>
<td>4</td>
</tr>
<tr>
<td>PLS 304 Introduction to Plant Breeding</td>
<td>4</td>
<td>AEPS 304 Introduction to Plant Breeding</td>
<td>4</td>
</tr>
<tr>
<td>PLS 313 Agricultural Entomology</td>
<td>4</td>
<td>AEPS 313 Agricultural Entomology</td>
<td>4</td>
</tr>
<tr>
<td>PLS 321 Weed Biology and Management</td>
<td>4</td>
<td>AEPS 321 Weed Biology and Management</td>
<td>4</td>
</tr>
<tr>
<td>PLS 323 Plant Pathology</td>
<td>4</td>
<td>AEPS 323 Plant Pathology</td>
<td>4</td>
</tr>
<tr>
<td>PLS 351 Experimental Technics and Analysis</td>
<td>4</td>
<td>AEPS 351 Experimental Technics and Analysis</td>
<td>4</td>
</tr>
<tr>
<td>PLS 410 Crop Physiology</td>
<td>4</td>
<td>AEPS 410 Crop Physiology</td>
<td>4</td>
</tr>
<tr>
<td>PLS 461 Senior Project I</td>
<td>2</td>
<td>AEPS 461 Senior Project I</td>
<td>2</td>
</tr>
<tr>
<td>PLS 462 Senior Project II</td>
<td>2</td>
<td>AEPS 462 Senior Project II</td>
<td>2</td>
</tr>
<tr>
<td>BOT 121 General Botany</td>
<td>4</td>
<td>BOT 121 General Botany</td>
<td>4</td>
</tr>
<tr>
<td>SS 120 Introductory Soil Science</td>
<td>4</td>
<td>SS 120 Introductory Soil Science</td>
<td>4</td>
</tr>
</tbody>
</table>

(b.) Summary of Unit breakdown.

<table>
<thead>
<tr>
<th>Proposed Plant Sciences Program</th>
<th>Units</th>
<th>Existing AEPS Program</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Major Courses</td>
<td>45</td>
<td>Total Major Courses</td>
<td>45</td>
</tr>
<tr>
<td>Support Courses</td>
<td>33</td>
<td>Support Courses</td>
<td>33</td>
</tr>
<tr>
<td>Concentration Courses</td>
<td>42-43</td>
<td>Concentration Courses</td>
<td>42-43</td>
</tr>
<tr>
<td>Approved Elective Courses</td>
<td>16-20</td>
<td>Approved Elective Courses</td>
<td>16-20</td>
</tr>
<tr>
<td>Free Elective Courses</td>
<td>3-4</td>
<td>Free Elective Courses</td>
<td>3-4</td>
</tr>
<tr>
<td>GE Courses Outside of Major/Support</td>
<td>52</td>
<td>GE Courses Outside of Major/Support</td>
<td>52</td>
</tr>
<tr>
<td>Total Units</td>
<td>Total Units</td>
<td>Total Units</td>
<td>180</td>
</tr>
</tbody>
</table>

3. Degree requirements from comparable programs in the CSU or other US institutions:

There are several “peer” programs within the CSU system that align closely with our Program requirements. A comparison of our program and CSU Fresno (http://fresnostate.edu/catalog/subjects/plant-science/plant-sci.html) is presented here (Table 5), and Fresno’s associated course descriptions can be found in Appendix C. The program requirements and course descriptions for Cal Poly Pomona (https://catalog.cpp.edu/preview_program.php?catoid=5&poid=1045) and CSU Chico (https://catalog.csuchico.edu/viewer/21/AGRI/PSSCONEUN.html) are also very similar to ours and those of CSU Fresno and can also be found in Appendix C.
Table 5. Comparison of major coursework in the proposed California Polytechnic State University, San Luis Obispo (Cal Poly) Plant Sciences (PLS) program and CSU Fresno Plant Science program. CPSU Units are quarter units, CSUF units are semester units.

<table>
<thead>
<tr>
<th>Proposed Cal Poly Plant Sciences Program</th>
<th>CSU Fresno Plant Science Program</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prefix and #</td>
<td>Course Title</td>
</tr>
<tr>
<td>PLS 120</td>
<td>Principles of Horticulture and Crop Science</td>
</tr>
<tr>
<td>PLS 124</td>
<td>Plant Propagation</td>
</tr>
<tr>
<td>PLS 304</td>
<td>Introduction to Plant Breeding</td>
</tr>
<tr>
<td>PLS 321</td>
<td>Weed Biology and Management</td>
</tr>
<tr>
<td>PLS 323</td>
<td>Plant Pathology</td>
</tr>
<tr>
<td>PLS 313</td>
<td>Agricultural Entomology</td>
</tr>
<tr>
<td>PLS 351</td>
<td>Experimental Techniques and Analysis</td>
</tr>
<tr>
<td>SS 120</td>
<td>Introductory Soil Science</td>
</tr>
<tr>
<td>PLS 410</td>
<td>Crop Physiology</td>
</tr>
<tr>
<td>PLS 461/462</td>
<td>Senior Project</td>
</tr>
<tr>
<td>BRAE 340*</td>
<td>Irrigation Water Management</td>
</tr>
<tr>
<td>AEPS 406, 431, 450**</td>
<td>Advanced Weeds, Entomology, Pathology</td>
</tr>
</tbody>
</table>

*these courses are listed as required Support Courses
**content included in these classes
Additional courses required at CSU Fresno are very similar if not identical to those required and Cal Poly SLO such as the chemistry, math, and biology (botany) requirements.

4. How will students currently enrolled in the degree program be accommodated?

Students with the existing degree title (Agricultural and Environmental Plant Sciences) will have the option of graduating with a B.S. in Agricultural and Environmental Plant Sciences or they can choose to graduate with a degree in Plant Sciences. It is our desire that students beginning our plant sciences program in Fall 2022 will have the degree title of Plant Sciences.

5. Summary:

The Horticulture and Crop Sciences Department proposes to change the name of the B.S. in Agricultural and Environmental Plant Sciences (AEPS) to Plant Sciences (PLS) while maintaining the same CIP Code (01.1102). We believe that making this name change will: a) clarify what our students will learn and be able to do as a result of earning this degree, b) better reflect the needs and demand of plant production industries for our graduates, and c) attract more students to our program and to plant (and food) production in general.
We all confirm that the proposed program modification aligns with the mission and strategic plan for the college and university.

<table>
<thead>
<tr>
<th>Name</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scott Steinmaus, Department Chair/Head</td>
<td>04/11/2022</td>
</tr>
<tr>
<td>Andy Thulin, Dean</td>
<td>04/12/2022</td>
</tr>
<tr>
<td>Gregory S. Bohr, Chair Academic Senate Curriculum Committee</td>
<td>04/11/2022</td>
</tr>
<tr>
<td>Bruno Giberti, Associate Vice Provost</td>
<td>04/12/2022</td>
</tr>
</tbody>
</table>
This proposal to change the Agricultural and Environmental Plant Sciences degree title to Plant Sciences was approved by the Academic Senate via the consent agenda on _____________. The signatures below represent campus support of this proposal.

<table>
<thead>
<tr>
<th>Name</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thomas D. Gutierrez, Chair, Academic Senate</td>
<td></td>
</tr>
<tr>
<td>Cynthia Jackson-Elmoore, Provost and Executive VicePresident for Academic Affairs</td>
<td></td>
</tr>
<tr>
<td>Jeffrey D. Armstrong, President</td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX A: SUPPORTING DATA

All of the following data for US-BLS can be found at: https://www.bls.gov/oes/2019/may/oes191013.htm

Occupational Employment and Wages, May 2020

19-1013 Soil and Plant Scientists

Conduct research in breeding, physiology, production, yield, and management of crops and agricultural plants or trees, shrubs, and nursery stock, their growth in soils, and control of pests; or study the chemical, physical, biological, and mineralogical composition of soils as they relate to plant or crop growth. May classify and map soils and investigate effects of alternative practices on soil and crop productivity.

National estimates for Soil and Plant Scientists:

Employment estimate and mean wage estimates for Soil and Plant Scientists:

<table>
<thead>
<tr>
<th>Employment (1)</th>
<th>Employment RSE*</th>
<th>Mean hourly wage</th>
<th>Mean annual wage (2)</th>
<th>Wage RSE (3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>13,950</td>
<td>4.6 %</td>
<td>$ 35.12</td>
<td>$ 73,040</td>
<td>1.5 %</td>
</tr>
</tbody>
</table>

Percentile wage estimates for Soil and Plant Scientists:

<table>
<thead>
<tr>
<th>Percentile</th>
<th>10%</th>
<th>25%</th>
<th>50% (Median)</th>
<th>75%</th>
<th>90%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hourly Wage</td>
<td>$ 19.06</td>
<td>$ 24.72</td>
<td>$ 31.79</td>
<td>$ 42.10</td>
<td>$ 56.46</td>
</tr>
<tr>
<td>Annual Wage (2)</td>
<td>$ 39,650</td>
<td>$ 51,420</td>
<td>$ 66,120</td>
<td>$ 87,560</td>
<td>$ 117,450</td>
</tr>
</tbody>
</table>

*RES is the Relative Standard Error of the estimate.

Industry profile for Soil and Plant Scientists:

Industries with the highest published employment and wages for Soil and Plant Scientists are provided. For a list of all industries with employment in Soil and Plant Scientists, see the Create Customized Tables function.

Industries with the highest levels of employment in Soil and Plant Scientists:

<table>
<thead>
<tr>
<th>Industry</th>
<th>Employment (1)</th>
<th>Percent of industry employment</th>
<th>Hourly mean wage</th>
<th>Annual mean wage (2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Management, Scientific, and Technical Consulting Services</td>
<td>2,340</td>
<td>0.15</td>
<td>$ 31.66</td>
<td>$ 65,840</td>
</tr>
<tr>
<td>Colleges, Universities, and Professional Schools</td>
<td>2,250</td>
<td>0.07</td>
<td>$ 29.72</td>
<td>$ 61,810</td>
</tr>
<tr>
<td>Scientific Research and Development Services</td>
<td>2,210</td>
<td>0.29</td>
<td>$ 44.30</td>
<td>$ 92,150</td>
</tr>
</tbody>
</table>
### Industries with the highest concentration of employment in Soil and Plant Scientists:

<table>
<thead>
<tr>
<th>Industry</th>
<th>Employment (1)</th>
<th>Percent of industry employment</th>
<th>Hourly mean wage</th>
<th>Annual mean wage (2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farm Product Raw Material Merchant Wholesalers</td>
<td>480</td>
<td>0.70</td>
<td>$34.63</td>
<td>$72,020</td>
</tr>
<tr>
<td>Museums, Historical Sites, and Similar Institutions</td>
<td>430</td>
<td>0.30</td>
<td>$25.57</td>
<td>$53,190</td>
</tr>
<tr>
<td>Scientific Research and Development Services</td>
<td>2,210</td>
<td>0.29</td>
<td>$44.30</td>
<td>$92,150</td>
</tr>
<tr>
<td>Merchant Wholesalers, Nondurable Goods (4241, 4247, and 4249 only)</td>
<td>1,340</td>
<td>0.25</td>
<td>$31.21</td>
<td>$64,930</td>
</tr>
<tr>
<td>Management, Scientific, and Technical Consulting Services</td>
<td>2,340</td>
<td>0.15</td>
<td>$31.66</td>
<td>$65,840</td>
</tr>
</tbody>
</table>

### Top paying industries for Soil and Plant Scientists:

<table>
<thead>
<tr>
<th>Industry</th>
<th>Employment (1)</th>
<th>Percent of industry employment</th>
<th>Hourly mean wage</th>
<th>Annual mean wage (2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemical Manufacturing (3251, 3252, 3253, and 3259 only)</td>
<td>80</td>
<td>0.02</td>
<td>$57.47</td>
<td>$119,540</td>
</tr>
<tr>
<td>Merchant Wholesalers, Nondurable Goods (4242 and 4246 only)</td>
<td>(8)</td>
<td>(8)</td>
<td>$52.45</td>
<td>$109,100</td>
</tr>
<tr>
<td>Management of Companies and Enterprises</td>
<td>180</td>
<td>0.01</td>
<td>$46.57</td>
<td>$96,860</td>
</tr>
<tr>
<td>Scientific Research and Development Services</td>
<td>2,210</td>
<td>0.29</td>
<td>$44.30</td>
<td>$92,150</td>
</tr>
<tr>
<td>Federal Executive Branch (OEWS Designation)</td>
<td>1,120</td>
<td>0.05</td>
<td>$43.37</td>
<td>$90,200</td>
</tr>
</tbody>
</table>
States with the highest employment level in this occupation:

<table>
<thead>
<tr>
<th>State</th>
<th>Employment (1)</th>
<th>Employment per thousand jobs</th>
<th>Location quotient (9)</th>
<th>Hourly mean wage</th>
<th>Annual mean wage (2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>California</td>
<td>2,580</td>
<td>0.15</td>
<td>1.54</td>
<td>$38.22</td>
<td>$79,490</td>
</tr>
<tr>
<td>Iowa</td>
<td>900</td>
<td>0.58</td>
<td>6.02</td>
<td>$32.91</td>
<td>$68,450</td>
</tr>
<tr>
<td>North Carolina</td>
<td>710</td>
<td>0.16</td>
<td>1.65</td>
<td>$29.13</td>
<td>$60,590</td>
</tr>
<tr>
<td>Minnesota</td>
<td>650</td>
<td>0.23</td>
<td>2.35</td>
<td>$36.08</td>
<td>$75,060</td>
</tr>
<tr>
<td>South Dakota</td>
<td>580</td>
<td>1.36</td>
<td>14.08</td>
<td>$28.85</td>
<td>$60,000</td>
</tr>
</tbody>
</table>

Here is what “Agricultural Managers” do:
Summary

Quick Facts: Farmers, Ranchers, and Other Agricultural Managers

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>2020 Median Pay</td>
<td>$68,090 per year $32.73 per hour</td>
</tr>
<tr>
<td>Typical Entry-Level Education</td>
<td>High school diploma or equivalent</td>
</tr>
<tr>
<td>Work Experience in a Related Occupation</td>
<td>5 years or more</td>
</tr>
<tr>
<td>On-the-job Training</td>
<td>None</td>
</tr>
<tr>
<td>Number of Jobs, 2020</td>
<td>888,300</td>
</tr>
<tr>
<td>Job Outlook, 2020-30</td>
<td>-1% (Little or no change)</td>
</tr>
<tr>
<td>Employment Change, 2020-30</td>
<td>-5,800</td>
</tr>
</tbody>
</table>

What Farmers, Ranchers, and Other Agricultural Managers Do

Farmers, ranchers, and other agricultural managers run establishments that produce crops, livestock, and dairy products.

Work Environment

Farmers, ranchers, and other agricultural managers typically work outdoors but also may spend time in an office. Their work is often physically demanding.

How to Become a Farmer, Rancher, or Other Agricultural Manager

Farmers, ranchers, and other agricultural managers typically need at least a high school diploma and work experience in a related occupation.

Pay

The median annual wage for farmers, ranchers, and other agricultural managers was $68,090 in May 2020.

Job Outlook

Employment of farmers, ranchers, and other agricultural managers is projected to show little or no change from 2020 to 2030.

Despite limited employment growth, about 84,800 openings for farmers, ranchers, and other agricultural managers are projected each year, on average, over the decade. Most of those openings are expected to result from the need to replace workers who transfer to different occupations or exit the labor force, such as to retire.
US-BLS directs any searches for Soil and Plant Science to Agricultural and Food Science

Agricultural and Food Scientists

Summary

<table>
<thead>
<tr>
<th>Quick Facts: Agricultural and Food Scientists</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>2020 Median Pay</strong></td>
</tr>
<tr>
<td><strong>Typical Entry-Level Education</strong></td>
</tr>
<tr>
<td><strong>Work Experience in a Related Occupation</strong></td>
</tr>
<tr>
<td><strong>On-the-job Training</strong></td>
</tr>
<tr>
<td><strong>Number of Jobs, 2020</strong></td>
</tr>
<tr>
<td><strong>Job Outlook, 2020-30</strong></td>
</tr>
<tr>
<td><strong>Employment Change, 2020-30</strong></td>
</tr>
</tbody>
</table>

What Agricultural and Food Scientists Do
Agricultural and food scientists research ways to improve the efficiency and safety of agricultural establishments and products.

Work Environment
Agricultural and food scientists work in laboratories, in offices, and in the field. Most agricultural and food scientists work full time.

How to Become an Agricultural or Food Scientist
Agricultural and food scientists need at least a bachelor’s degree from an accredited postsecondary institution, although many get advanced degrees.

Pay
The median annual wage for agricultural and food scientists was $68,830 in May 2020.

Job Outlook
Overall employment of agricultural and food scientists is projected to grow 9 percent from 2020 to 2030, about as fast as the average for all occupations.

About 4,400 openings for agricultural and food scientists are projected each year, on average, over the decade. Many of those openings are expected to result from the need to replace workers who transfer to different occupations or exit the labor force, such as to retire.
Table 1. Agriculture degree, 2018
A glimpse of workers in this degree field.

<table>
<thead>
<tr>
<th></th>
<th>Agriculture</th>
<th>All Fields</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employment</td>
<td>610,070</td>
<td>55,381,020</td>
</tr>
<tr>
<td>Median wage</td>
<td>$50,000</td>
<td>$59,000</td>
</tr>
<tr>
<td>Percent employed part time</td>
<td>13</td>
<td>15</td>
</tr>
<tr>
<td>Percent employed in occupations requiring at least a bachelor’s degree</td>
<td>41</td>
<td>59</td>
</tr>
<tr>
<td>Percent with an advanced degree</td>
<td>29</td>
<td>37</td>
</tr>
</tbody>
</table>

Source: U.S. Census Bureau, American Community Survey.

Questions you may have
What is being compared?
The table compares people with this degree against people in all fields who have a bachelor’s degree.

What is a median wage?
The median is a midpoint: Half of people in this degree field earned more than this amount each year, and half earned less.

What is a bachelor’s degree?
A bachelor’s degree usually requires at least 4 years of full-time academic study beyond high school.

What is an advanced degree?
Advanced degrees include master’s, doctoral, or professional degrees and may be in a field other than that of the bachelor’s degree. They usually require at least 1 to 3 years of full-time academic study beyond a bachelor’s degree.

Chart 1. Types of agriculture majors, 2018

88% focused on one of these concentrations

Note: The sum of percents by major may not total 100 due to rounding.
Source: U.S. Census Bureau, American Community Survey.
Occupations, outlook, and more

Occupations are sorted into 23 broad groups based on job duties using the Standard Occupation Classification (SOC) System. For example, various types of managers are grouped together in management occupations. Chart 2 shows the largest shares of this field employed by SOC occupational group.

Chart 2: Employment distribution of workers with an agriculture degree, by occupational group, 2018

- Management occupations
- Sales and related occupations
- Healthcare practitioners and technical occupations
- Educational instruction and library occupations
- Business and financial operations occupations
- Other

60% worked in one of these occupational groups

Note: The sum of percent by major may not total 100 due to rounding.
Source: U.S. Census Bureau, American Community Survey.

Chart 1. Projected employment change by occupational group, 2020–2030 (percent)

Total, all occupations

Note: Expected recovery from COVID-19 recession represents the reversal of declines in employment between 2019 and 2020 for occupational groups that experienced declines during that period.
## APPENDIX B: Existing and Proposed Course Requirements details
(https://aeps.calpoly.edu/aeps/aeps-major)

### MAJOR COURSES

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>AEPS 101</td>
<td>Orientation to Horticulture and Crop Science</td>
<td>1</td>
</tr>
<tr>
<td>AEPS 120</td>
<td>Principles of Horticulture and Crop Science</td>
<td>4</td>
</tr>
<tr>
<td>AEPS 124</td>
<td>Plant Propagation</td>
<td>4</td>
</tr>
<tr>
<td>AEPS 304</td>
<td>Introduction to Plant Breeding</td>
<td>4</td>
</tr>
<tr>
<td>AEPS 313</td>
<td>Agricultural Entomology</td>
<td>4</td>
</tr>
<tr>
<td>AEPS 321</td>
<td>Weed Biology and Management</td>
<td>4</td>
</tr>
<tr>
<td>AEPS/BOT 323</td>
<td>Plant Pathology</td>
<td>4</td>
</tr>
<tr>
<td>AEPS 351</td>
<td>Experimental Techniques and Analysis</td>
<td>4</td>
</tr>
<tr>
<td>AEPS 410</td>
<td>Crop Physiology</td>
<td>4</td>
</tr>
<tr>
<td>AEPS 461</td>
<td>Senior Project I</td>
<td>2</td>
</tr>
<tr>
<td>AEPS 462</td>
<td>Senior Project II</td>
<td>2</td>
</tr>
<tr>
<td>BOT 121</td>
<td>General Botany (B2 &amp; B3)</td>
<td>4</td>
</tr>
<tr>
<td>SS 120</td>
<td>Introductory Soil Science</td>
<td>4</td>
</tr>
</tbody>
</table>

Concentration courses (see below) 42-43

### SUPPORT COURSES

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGB 214</td>
<td>Agribusiness Financial Accounting</td>
<td>4</td>
</tr>
<tr>
<td>or BUS 212</td>
<td>Financial Accounting for Nonbusiness Majors</td>
<td></td>
</tr>
<tr>
<td>or AGB 212</td>
<td>Agricultural Economics</td>
<td></td>
</tr>
<tr>
<td>BRAE 340</td>
<td>Irrigation Water Management (Upper-Division B)</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 127</td>
<td>General Chemistry for Agriculture and Life Science I (B1 &amp; B3)</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 128</td>
<td>General Chemistry for Agriculture and Life Science II</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 312</td>
<td>Survey of Organic Chemistry</td>
<td>5</td>
</tr>
<tr>
<td>MATH 118</td>
<td>Precalculus Algebra (B4)</td>
<td>4</td>
</tr>
</tbody>
</table>

Select from the following: 4

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPAN 101</td>
<td>Elementary Spanish I</td>
</tr>
<tr>
<td>Course Code</td>
<td>Course Title</td>
</tr>
<tr>
<td>-------------</td>
<td>--------------</td>
</tr>
<tr>
<td>SPAN 102</td>
<td>Elementary Spanish II</td>
</tr>
<tr>
<td>SPAN 103</td>
<td>Elementary Spanish III</td>
</tr>
<tr>
<td>SPAN 111</td>
<td>Elementary Hispanic Language and Culture (USCP)</td>
</tr>
<tr>
<td>SS 221</td>
<td>Soil Health and Plant Nutrition</td>
</tr>
<tr>
<td>STAT 218</td>
<td>Applied Statistics for the Life Sciences (GE Electives)</td>
</tr>
</tbody>
</table>

**GENERAL EDUCATION (GE)**

(See GE program requirements below.)

**FREE ELECTIVES**

Free Electives: 3-4 units

**Total units:** 180

**Concentrations (select one)**
- Environmental Horticultural Science
- Fruit and Crop Science
- Plant Protection Science

**Environmental Horticulture Concentration Courses:**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>AEPS 123</td>
<td>Landscape Installation and Maintenance</td>
<td>4</td>
</tr>
<tr>
<td>AEPS 127</td>
<td>Horticulture and Landscape Design</td>
<td>4</td>
</tr>
<tr>
<td>AEPS 233</td>
<td>Plant Materials I</td>
<td>4</td>
</tr>
<tr>
<td>AEPS 234</td>
<td>Plant Materials II</td>
<td>4</td>
</tr>
<tr>
<td>AEPS 245</td>
<td>Horticultural Production Techniques</td>
<td>4</td>
</tr>
<tr>
<td>AEPS 350</td>
<td>Abiotic Plant Problems</td>
<td>3</td>
</tr>
<tr>
<td>AEPS 427</td>
<td>Disease and Pest Control Systems for Ornamental Plants</td>
<td>4</td>
</tr>
</tbody>
</table>

**Approved Electives**

Select from the following (at least 8 units must be upper-division):

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>AEPS 126</td>
<td>Landscape Construction</td>
</tr>
<tr>
<td>AEPS 200</td>
<td>Special Problems for Undergraduates</td>
</tr>
<tr>
<td>AEPS 212</td>
<td>Environmental Horticulture Enterprise Project I</td>
</tr>
<tr>
<td>or AEPS 312</td>
<td>Environmental Horticulture Enterprise Project II</td>
</tr>
<tr>
<td>AEPS 215</td>
<td>Floral Design I</td>
</tr>
<tr>
<td>AEPS 225</td>
<td>Floral Design II</td>
</tr>
<tr>
<td>AEPS 327</td>
<td>Vertebrate Pest Management</td>
</tr>
<tr>
<td>Course Code</td>
<td>Course Title</td>
</tr>
<tr>
<td>-------------</td>
<td>--------------------------------------------------</td>
</tr>
<tr>
<td>AEPS 332</td>
<td>Landscape Contracting</td>
</tr>
<tr>
<td>AEPS 333</td>
<td>Greenhouse Vegetable Production</td>
</tr>
<tr>
<td>AEPS 339</td>
<td>Internship in Horticulture and Crop Science ³</td>
</tr>
<tr>
<td>AEPS 340</td>
<td>Principles of Greenhouse Environment</td>
</tr>
<tr>
<td>AEPS 341</td>
<td>Cut Flower Production</td>
</tr>
<tr>
<td>AEPS 342</td>
<td>Potted Plant Production</td>
</tr>
<tr>
<td>AEPS 343</td>
<td>Turfgrass Management</td>
</tr>
<tr>
<td>AEPS 381</td>
<td>Native Plants for California Landscapes</td>
</tr>
<tr>
<td>AEPS 400</td>
<td>Special Problems for Advanced Undergraduates ²</td>
</tr>
<tr>
<td>AEPS 421</td>
<td>Postharvest Technology of Horticultural Crops</td>
</tr>
<tr>
<td>AEPS 424</td>
<td>Nursery Crop Production</td>
</tr>
<tr>
<td>AEPS 425</td>
<td>Arboriculture</td>
</tr>
<tr>
<td>AEPS 428</td>
<td>Advances in Plant Pathology</td>
</tr>
<tr>
<td>AEPS 432</td>
<td>Specialized Operations for Golf Courses and Athletic Fields</td>
</tr>
<tr>
<td>AEPS 437</td>
<td>Park and Public Space Management</td>
</tr>
<tr>
<td>AEPS 441</td>
<td>Biological Control for Pest Management</td>
</tr>
<tr>
<td>BRAE 337</td>
<td>Landscape Irrigation</td>
</tr>
<tr>
<td>BUS 346</td>
<td>Principles of Marketing</td>
</tr>
</tbody>
</table>

**Total units**: 43

1. Consultation with advisor is recommended prior to selecting Approved Electives; bear in mind your selections may impact pursuit of post-baccalaureate studies and/or goals.

2. A maximum of 2 units of AEPS 200 and/or a maximum of 2 units of AEPS 400 may count towards Approved Electives.

3. A maximum of 4 units of AEPS 339 may count towards Approved Electives.

### Fruit and Crop Science Concentration Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>AEPS 132</td>
<td>Pomology I</td>
<td>4</td>
</tr>
<tr>
<td>AEPS 133</td>
<td>Pomology II</td>
<td>4</td>
</tr>
<tr>
<td>AEPS 190</td>
<td>California Vegetable Production</td>
<td>4</td>
</tr>
<tr>
<td>AEPS 203</td>
<td>Organic Enterprise Project</td>
<td>2</td>
</tr>
<tr>
<td>or AEPS 205</td>
<td>Orchard and Vegetable Enterprise Project</td>
<td></td>
</tr>
<tr>
<td>or AEPS 333</td>
<td>Greenhouse Vegetable Production</td>
<td></td>
</tr>
<tr>
<td>Course Code</td>
<td>Course Title</td>
<td>Units</td>
</tr>
<tr>
<td>-------------</td>
<td>--------------------------------------------------</td>
<td>-------</td>
</tr>
<tr>
<td>AEPS/BRAE 244</td>
<td>Precision Farming</td>
<td>4</td>
</tr>
<tr>
<td>AEPS 421</td>
<td>Postharvest Technology of Horticultural Crops</td>
<td>4</td>
</tr>
</tbody>
</table>

**Approved Electives (at least 11 units must be upper-division)**

Select from the following: 20 units

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>AEPS 150</td>
<td>Forage Crops</td>
</tr>
<tr>
<td>AEPS 175</td>
<td>Beekeeping</td>
</tr>
<tr>
<td>AEPS 200</td>
<td>Special Problems for Undergraduates 2</td>
</tr>
<tr>
<td>AEPS 240</td>
<td>Commercial Seed Production</td>
</tr>
<tr>
<td>AEPS 327</td>
<td>Vertebrate Pest Management</td>
</tr>
<tr>
<td>AEPS 334</td>
<td>Greenhouse Vegetable Enterprise Project</td>
</tr>
<tr>
<td>AEPS 339</td>
<td>Internship in Horticulture and Crop Science 3</td>
</tr>
<tr>
<td>AEPS 340</td>
<td>Principles of Greenhouse Environment</td>
</tr>
<tr>
<td>AEPS 355</td>
<td>Citrus and Avocado Fruit Production</td>
</tr>
<tr>
<td>AEPS 400</td>
<td>Special Problems for Advanced Undergraduates 2</td>
</tr>
<tr>
<td>AEPS 406</td>
<td>Advanced Weed Management</td>
</tr>
<tr>
<td>AEPS/WVIT 414</td>
<td>Grape Pest Management</td>
</tr>
<tr>
<td>AEPS 420</td>
<td>Organic Crop Production Systems</td>
</tr>
<tr>
<td>AEPS 427</td>
<td>Disease and Pest Control Systems for Ornamental Plants</td>
</tr>
<tr>
<td>AEPS 428</td>
<td>Advances in Plant Pathology</td>
</tr>
<tr>
<td>AEPS 431</td>
<td>Insect Pest Management</td>
</tr>
<tr>
<td>AEPS 441</td>
<td>Biological Control for Pest Management</td>
</tr>
<tr>
<td>AEPS 445</td>
<td>Cropping Systems</td>
</tr>
<tr>
<td>AEPS 450</td>
<td>Current Issues in the Strawberry Industry</td>
</tr>
<tr>
<td>AG/ASCI 360</td>
<td>Holistic Management</td>
</tr>
<tr>
<td>BRAE 405</td>
<td>Chemigation</td>
</tr>
<tr>
<td>BRAE 438</td>
<td>Drip/Micro Irrigation</td>
</tr>
<tr>
<td>BRAE 440</td>
<td>Agricultural Irrigation Systems</td>
</tr>
<tr>
<td>FSN 275</td>
<td>Elements of Food Safety</td>
</tr>
<tr>
<td>SS 321</td>
<td>Soil Morphology</td>
</tr>
<tr>
<td>SS 322</td>
<td>Soil Plant Relationships</td>
</tr>
<tr>
<td>WVIT 233</td>
<td>Basic Viticulture</td>
</tr>
<tr>
<td>Course Code</td>
<td>Course Title</td>
</tr>
<tr>
<td>-------------</td>
<td>------------------------------------</td>
</tr>
<tr>
<td>WVIT/AEPS 331</td>
<td>Advanced Viticulture - Fall</td>
</tr>
<tr>
<td>WVIT 332</td>
<td>Advanced Viticulture - Winter</td>
</tr>
<tr>
<td>WVIT 333</td>
<td>Advanced Viticulture - Spring</td>
</tr>
</tbody>
</table>

**Total units**: 42

1. Consultation with advisor is recommended prior to selecting Approved Electives; bear in mind your selections may impact pursuit of post-baccalaureate studies and/or goals.

2. A maximum of 2 units of **AEPS 200** and/or a maximum of 2 units of **AEPS 400** may count towards Approved Electives.

3. A maximum of 4 units of **AEPS 339** may count towards Approved Electives.

### Plant Protection Concentration Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>AEPS 203</td>
<td>Organic Enterprise Project</td>
<td>2</td>
</tr>
<tr>
<td>or AEPS 205</td>
<td>Orchard and Vegetable Enterprise Project</td>
<td></td>
</tr>
<tr>
<td>or AEPS 212</td>
<td>Environmental Horticulture Enterprise Project I</td>
<td></td>
</tr>
<tr>
<td>or AEPS 312</td>
<td>Environmental Horticulture Enterprise Project II</td>
<td></td>
</tr>
<tr>
<td>or AEPS 333</td>
<td>Greenhouse Vegetable Production</td>
<td></td>
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<tr>
<td>AEPS 327</td>
<td>Vertebrate Pest Management</td>
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<tr>
<td>AEPS 406</td>
<td>Advanced Weed Management</td>
<td>4</td>
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<tr>
<td>AEPS 427</td>
<td>Disease and Pest Control Systems for Ornamental Plants</td>
<td>4</td>
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<tr>
<td>AEPS 431</td>
<td>Insect Pest Management</td>
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<tr>
<td>AEPS 441</td>
<td>Biological Control for Pest Management</td>
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### Approved Electives

Select from the following: 20

<table>
<thead>
<tr>
<th>Course Code</th>
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<tbody>
<tr>
<td>AEPS 132</td>
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<tr>
<td>AEPS 133</td>
<td>Pomology II</td>
</tr>
<tr>
<td>AEPS 150</td>
<td>Forage Crops</td>
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<tr>
<td>AEPS 175</td>
<td>Beekeeping</td>
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<tr>
<td>AEPS 190</td>
<td>California Vegetable Production</td>
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<tr>
<td>AEPS 200</td>
<td>Special Problems for Undergraduates 2</td>
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<td>AEPS 240</td>
<td>Commercial Seed Production</td>
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<td>AEPS/BRAE 244</td>
<td>Precision Farming</td>
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Academic Programs and Planning
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<td>Horticultural Production Techniques</td>
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<td>AEPS 334</td>
<td>Greenhouse Vegetable Enterprise Project</td>
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<tr>
<td>AEPS 339</td>
<td>Internship in Horticulture and Crop Science ³</td>
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<td>AEPS 340</td>
<td>Principles of Greenhouse Environment</td>
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<td>AEPS 341</td>
<td>Cut Flower Production</td>
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<td>AEPS 342</td>
<td>Potted Plant Production</td>
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<td>AEPS 343</td>
<td>Turfgrass Management</td>
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<tr>
<td>AEPS 355</td>
<td>Citrus and Avocado Fruit Production</td>
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<td>AEPS 400</td>
<td>Special Problems for Advanced Undergraduates ²</td>
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<td>AEPS 420</td>
<td>Organic Crop Production Systems</td>
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<td>AEPS 421</td>
<td>Postharvest Technology of Horticultural Crops</td>
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<td>AEPS 445</td>
<td>Cropping Systems</td>
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<td>AEPS 450</td>
<td>Current Issues in the Strawberry Industry</td>
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<td>CHEM 313</td>
<td>Survey of Biochemistry and Biotechnology</td>
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<td>FSN 275</td>
<td>Elements of Food Safety</td>
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<td>MCRO 221</td>
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<td>Advanced Viticulture - Fall</td>
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<td>WVIT 332</td>
<td>Advanced Viticulture - Winter</td>
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<tr>
<td>WVIT 333</td>
<td>Advanced Viticulture - Spring</td>
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**Total units**: 42

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1. Consultation with advisor is recommended prior to selecting Approved Electives; bear in mind your selections may impact pursuit of post-baccalaureate studies and/or goals.

2. A maximum of 2 units of AEPS 200 and/or a maximum of 2 units of AEPS 400 may count towards Approved Electives.

3. A maximum of 4 units of AEPS 339 may count towards Approved Electives.

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**APPENDIX C: Program Requirements and Course Descriptions For other CSU Programs:**
1. Major Requirements (78 units)

Core Courses (38 units)

PLANT 71, 99, 100, 101, 107 or 108, 150, 160, 161, 162, 163, 172, and 172L

Select three (3) units from MEAG

Select one (1) unit from PLANT 180, 190, 194I, or 196 in consultation with a faculty adviser.

Electives (24 units)

Select twenty-four (24) units of electives that best meet your career objectives. A maximum of nine (9) units may be lower division, including any department-approved transfer courses. Note: Electives cannot double count in the required core.

- MEAG 3, 20, or 50
- PLANT 1, 20, 30, 40, 41, or 60
- MEAG 103, 112, 113, 114, or 120
- PLANT 105, 120, 121, 122, 123, 124, 130, 132, 133, 140, 141, 142, 143, 164, 165, 166, 167, 168, 170T, 174, or 175

Of the twenty-four (24) units of electives required you may select one (1) to three (3) courses from outside of the major from the courses listed below. Additional prerequisites may be required for some courses. Other electives outside the major not listed below may be considered, but will require prior department chair approval and may have additional prerequisites.

- AGBS 1, 28, 31, 100, 109, 110, 117, 120, 130, 140, 150, 155, 160, 162, 163, or 164
- BIOL 124, 125, 132, 140, 150, 156, or 171
- CHEM 105
- EES 185 or 186
- IT 186
- VIT 1, 101, 102, 103, 105, 106, 160, or 165

Additional Requirements (16 units)*

CHEM 3A (Area B1); BIOL 11 (Area B2); MATH 11 (Area B4); CHEM 8 or 3B; CHEM 150

2. General Education requirements (49 units)

3. Other requirements (9 units)

American Government and Institutions (PLSI 2), Multicultural and International (MI), and Upper-division writing. Note: Plant Science majors are exempt from the MI requirement.

4. Sufficient elective units to meet required total units (varies)

5. Total units (120)**

* Ten (10) units of additional requirements (CHEM 3A, BIOL 11, and MATH 11) are also being used to fulfill (10) units of the G.E. requirement.
CSU Fresno Course Descriptions (https://fresnostate.edu/catalog/courses-by-department/plant-science/index.html)

PLANT 20. Introduction to Crop Science. Principles of production for cereal, row, forage and vegetable crops. Culture, insect and disease control, harvesting, storage, and marketing. (Formerly CRSC 1)

PLANT 30. Introduction to Fruit Science. Origin and distribution of grape and tree fruit crops. Botanical and commercial classification of grapes and tree fruits and their culture in California. (Formerly HORT 1)

PLANT 40. Introduction to Ornamental Horticulture. Planting and maintenance of the home landscape; selection, planting, fertilization, and pruning of plants; lawn planting and care. (2 lecture, 3 lab hours) (Formerly OH 1) (Course fee, $10)

PLANT 41. Floral Design. Principles and rules of design and color using plants as a media; European and Japanese influences; emphasis on American line-mass and contemporary designs. An assortment of arrangements are made in lab. (2 lecture, 3 lab hours) (Course fee, $50) ( Formerly OH 4)

PLANT 60. Introduction to Plant Health. Origin, history, and evaluation of protective measures (chemical, biological, and cultural) for the management of insects, diseases, weeds, and rodents in the field and around the home. (Formerly PLTH 1)

PLANT 70. Introduction to Irrigated Soils. Interpretation of physical and chemical properties of biological and mineral matter for the management of soils in irrigated agriculture. Emphasis on soil/plant and plant/water relationships. (Formerly SW 1)

PLANT 71. Agricultural Water. Water resources and problems in California; water requirements for agricultural and ornamental crops; irrigation scheduling and application methods. (2 lecture, 3 lab hours)

PLANT 99. Introduction to Biometrics. Introduction to experimental methods and statistical procedures with particular emphasis on applied biological systems. Design of experiments; statistical analysis and interpretation.

PLANT 100. Aspects of Crop Productivity. Study of the growth, development, and basic physiological processes of cultivated crops. Environmental influences on crop growth and development processes and management techniques to minimize stresses and maximize crop yield and quality.

PLANT 101. Crop Nutrition. Evaluation of nutrient elements in soils; application of fertilizers and organic waste to meet nutrient requirements; soil and plant tissue analysis and interpretation; fertilizer recommendations for different crops. (2 lecture, 3 lab hours) (Formerly SW 101)

PLANT 105. Food, Society, and Environment. Linkages among food production systems, human social behavior, and environmental quality. Basic principles of environmental and agricultural sciences as applied to interrelationships among social value systems, agricultural activities and environmental resources. G.E. Integration IB.

PLANT 107. Plant Propagation. Principles and practices of propagating plants, sexual and asexual. Seeds, cuttings, layering, grafting, budding, and tissue culture. Propagation media and rooting aids. (2 lecture, 3 lab hours; field trips)

PLANT 108. Micropropagation. Principles of plant propagation by aseptic cell and organ culture as a means of rapid cloning, elimination of systemic plant diseases, production of somatic hybrids, ploidy change, and other genetic variants for use in plant breeding. (2 lecture, 3 lab hours) (Formerly PLANT 102)


PLANT 120. Row Crops. The culture of beans, cotton, sugar beets, and oil crops; varieties, nutrition, insect, disease, and weed control; harvest, storage, uses, and marketing. (2 lecture, 3 lab hours) (Formerly CRSC 101)

PLANT 121. Cereal and Forage Crops
Prerequisites: BIOL 11, PLANT 20. The culture of barley, corn, sorghum, oats, rice, rye and wheat; varieties, nutrition, insect disease, and weed control; harvest, storage, uses, and marketing. (2 lecture, 3 lab hours)

PLANT 122. Range Ecology and Management. Identification of range and pasture plants; carrying capacity; methods of range and pasture improvement, grazing management, water development, rodents, fertilization, reseeding, brush removal; mountain range resources. (2 lecture, 3 lab hours) (Formerly CRSC 105)

PLANT 123. Vegetable Production. Cultural practices, harvesting, processing, and marketing of vegetables of economic importance to California and the San Joaquin Valley. (2 lecture, 3 lab hours)
ACADEMIC PROGRAMS AND PLANNING

25

PLANT 124. Organic Crop Production. Cultural practices, harvesting, processing, and marketing of organically grown crops of economic importance to California and the San Joaquin Valley.

PLANT 130. Fruit Species of California. Fruit and nut species common to California, their adaptation and uses.

PLANT 132. Principles of Pomology II. Pruning, fruit and vegetative development, pollination, rootstocks, propagation, and nutrition. Crop fundamentals of spring cultural practices. (2 lecture, 3 lab hours)

PLANT 133. Citrus and Subtropical Fruits. Geographic distribution, climatic and soil adaptation of subtropical fruit crops. Fruit and vegetative development and cultural practices for globally important fruit crops. Emphasis on citrus and olive (2 lecture, 3 lab hours)

PLANT 134. Micrometeorology. Micrometeorological influences on local climates including natural ecosystems and varying agricultural canopies. Local climate influences on wildlife, domestic animals, and humans. Manipulation of local climate including frost protection, irrigation and wind sheltering. Microclimates of non-uniform terrain and urban environment.

PLANT 140. Greenhouse & Nursery Crop Production. Fundamentals of greenhouse and nursery crop production. Emphasis on sustainable and economically viable production and management systems for significant flower, foliage and nursery crops. (3 lecture, 3 lab hours; field trips)

PLANT 141. Woody Plant Materials. Survey of woody plant materials including identification, growth habits and cultural requirements. Emphasis on plants used in the California landscape. (2 lecture, 3 lab hours; field trips)

PLANT 142. Herbaceous Plant Materials. Survey of herbaceous plants materials including identification, growth habits and cultural requirements. Emphasis on plants used in California landscapes, botanical gardens and arboreta. (2 lecture, 3 lab hours; 2 Saturday field trips)

PLANT 143. Turfgrass Production and Management. Production and maintenance of grass for lawns, public parks, public institutions, playgrounds, playing fields, golf courses, bowling greens; identification of turfgrasses and turfgrass seed. (2 lecture, 3 lab hours; field trip)

PLANT 150. Crop Improvement. Application of genetic, cytological and environmental principles to the improvement of plants; heredity and variation in plants, effects of environmental factors, biotechnology, self- and cross-fertilization; principles and results of selection and hybridization in plant improvement.


PLANT 161. Plant Pathology. Study of the causal agents, disease cycles, and control of plant diseases. (2 lecture, 3 lab hours) (Formerly PLTH 106)

PLANT 162. Economic Entomology. Biology, ecology, management and taxonomy of economically important arthropods, with special emphasis on agricultural ecosystems in California. (2 lecture, 3 lab hours)

PLANT 163. Integrated Pest Management. Concepts and principles of integrated pest management. Insect and mite pest problems; sampling techniques; biology and ecology of major agricultural pest; integration of control measures for the management of economic pests. (2 lecture, 3 lab hours) (Formerly PLTH 108)

PLANT 164. Plant Nematology. Biology, taxonomy, host-parasite relationships, soil ecology, conventional and innovative controls, plant diagnosis and laboratory techniques with emphasis on plant-parasitic species.

PLANT 165. Pesticides. Typical uses, modes of action, mechanisms of selectivity, environmental interactions, and user safety of insecticides, herbicides, fungicides, nematicides, rodenticides, and plant growth regulators. Effective and safe use of agriculture chemicals by reading labels and following laws/regulations.

PLANT 166. Mycology. Growth, physiology, reproduction, taxonomy, ecology, and economic impacts of fungi, slime molds, and oomycota. Role of fungi as symbionts, pathogens, and saprophytes are examined (2 lecture, 3 lab hours)

PLANT 167. Diagnosis and Control of Plant Diseases. Techniques for diagnosis of specific diseases in California and selection criteria for control strategies. Students will practice diagnostic techniques for selecting preventative, cultural, biological, physical, and chemical disease control strategies for major plant diseases.

PLANT 168. Biological Control. Study of the action of parasites, predators, and pathogens on the population dynamics of their host/prey organisms; focus on arthropods, with additional emphasis on microorganisms, weeds, nematodes, and vertebrates. (Formerly PLTH 107)

PLANT 170T. Topics in Plant Science. Selected topics in plant science, agronomy, horticulture, and other associated areas. Topics may require lab hours.

PLANT 170T. Bee Biology & Apiculture. This course provides an over view of the practice of apiculture (beekeeping), pollinator ecology, and the practical considerations of pollination in agriculture. Students are
provided with a theoretical background on these topics and hands on experience managing honey bee hives. Special emphasis is placed on the practice or rearing honeybee colonies.

PLANT 171. Soils in the Environment. Physical, chemical, and biological properties of soils as the interconnecting link in the biosphere; factors that influence soil formation; role of soil in food and fiber production. Not open to Plant Science and Viticulture & Enology majors. (2 lecture; 3 lab hours).

PLANT 172. Soils. Physical, chemical, and biological properties of soils as a medium for plant growth and as a natural body, factors that influence soil formation; food and fiber production; fertilizer and soil amendment use and environmental impact; soil's role in the biosphere. (Formerly SW 100)

PLANT 172L. Soils Lab. Physical, chemical, and biological analysis. Interpretation of field and laboratory data. (3 lab hours) (Saturday field trip)

PLANT 174. Soil and Water Management. Management of irrigated soils with particular emphasis on crop water requirements, irrigation scheduling, salinity, and other physical and chemical soil problems of field crops, permanent crops and landscapes.

PLANT 175. Irrigation Systems. Principles of planning, installation and evaluation of irrigation systems for field crops, permanent crops and ornamental horticulture. Pressurized systems (sprinkler and drip irrigation) emphasized. (Formerly SW 111)


PLANT 190. Independent Study.

PLANT 194I. Agricultural Internship. Field experience in your career specialty that integrates with classroom instruction. Written reports of knowledge and experience gained are required. CR/NC grading only.

PLANT 196. Crop Projects. Knowledge gained from classroom instruction applied to field conditions. Students will participate in growing and marketing a crop using the University Agricultural Laboratory. Approved for PLANT 250T. Topics in Plant Science. Advanced studies in a selected area of Plant Science which could include new or emerging issues and technologies. Topics may require lab hours.


PLANT 252. Plant Nutrition. Soil factors influencing nutrient availability, mineral requirements of plants, acquisition and translocation of nutrients and their role in plant metabolism. Soil and tissue analysis for fertility management. (2 lecture, 3 lab hours)

PLANT 255. Advanced Plant Breeding. Principles and techniques of plant improvement, breeding methods, combining ability, sterility systems, quantitative genetic analysis, heritability estimates, experimental designs for plant breeding.


PLANT 261. Advanced Plant Health Management. Comprehensive study of arthropod, disease, and weed problems in California cropping systems. Examination of complex relationships among crop plants and other biological organisms in agro-ecosystems design crop health management programs that are economically viable and ecologically sound.

PLANT 270. Seminar in Plant Science. Reviews of published and/or original research in the broad areas of crop science, soil and water relations, and plant health.

PLANT 290. Independent Study.

PLANT 299. Thesis

PLANT 299C. Thesis Continuation

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**Cal Poly Pomona Curriculum**

(https://catalog.cpp.edu/preview_program.php?catoid=5&poid=1045)

**Required Core Courses for Major: 57 units**
Required of all students. A 2.0 cumulative GPA is required in core courses in order to receive a degree in the major.

- AG 100 - Orientation to the College of Agriculture (1)
- PLT 131/131L - Landscape Horticulture (3/1)
- PLT 132/132L - Plant Propagation (3/1)
- PLT 133/133L - Agricultural Cropping Systems (3/1)
- PLT 231/231L - Basic Soil Science (3/1)
- PLT 232 - Irrigation and Water Management (4)
- PLT 233/233L - Introduction to Arthropods (3/1)
- PLT 301 - Investigative Techniques in Plant Science (4)
- PLT 302 - Technology Innovations in Plant Science (4)
- PLT 331/331L - Weeds and Weed Control (3/1)
- PLT 332/332L - Soil Fertility and Fertilizers (3/1)
- PLT 333 - Integrated Pest Management (4)
- PLT 401 - Crop Ecology (4)
- PLT 411 - Environmental Toxicology (4)
- PLT 441 - Internship in Plant Science (2-4) or
- PLT 461 - Senior Project (2)
- PLT 463 - Undergraduate Seminar (2)

**Required Support Courses: 42 units**

- ABM 224 - Accounting for Agribusiness (4)
- AG 101 - Agriculture and the Modern World (4) (D2)
- AG 401 - Ethical Issues in Food, Agricultural, and Apparel Industries (4) (D4)
- BIO 115/115A/115L - Basic Biology (3/1/1) (B2,B3)
- BOT 201/201L - Form and Function in Plants (3/1)
- BOT 428/428L - Plant Physiology (4/1)
- CHM 122 - General Chemistry (3) and
- CHM 122L - General Chemistry Laboratory (1)
- CHM 121 - General Chemistry (3) (B1) and
- CHM 121L - General Chemistry Laboratory (1) (B3)
- PLT 421/421L - Crop Diseases (3/1) or
- PLT 427/427L - Diseases of Ornamentals (3/1)
- STA 120 - Statistics with Applications (4) (B4)

**Note(s):**

For Plant Science Students - Select a sufficient number of courses so that the total from Directed Support and GE is at least 93 units.

**Elective Support Courses: 29 units**

Determined in consultation with your advisor (21 units)

**Business Courses:** Choose 8 units

- ABM 328 - Agribusiness Enterprise Management (4)
- ABM 402 - Agribusiness Personnel Management (4)
- EBZ 301 - Introduction to Electronic Business (4)
- EBZ 302 - E-business Technology (4)
- FRL 201 - Legal Environment of Business Transactions (4)
- HRT 320 - Club Operations (4)
- IBM 301 - Principles of Marketing Management (4)
- MHR 301 - Principles of Management (4)
- MHR 313 - First-line Management (4)
- MHR 318 - Organizational Behavior (4)
- MHR 320 - Introduction to Entrepreneurship (4)
- TOM 301 - Operations Management (4)

**Unrestricted Electives: 4 units**
Course Requirements for the Major: 78-85 units
Completion of the following courses, or their approved transfer equivalents, is required of all candidates for this degree. Additional required courses, depending upon the selected option are outlined following the major core program requirements.

Major Core Program: 57-60 units
Lower-Division Core: 33-35 units

6 courses required:
- ABUS 101 Introduction to Agricultural Business and Economics
- AGET 150 Agricultural Machine Systems
- AGRI 180 The University Experience
- MATH 105 Introduction to Statistics
- PSSC 101 Introduction to Plant Science
- PSSC 250 Introduction to Soil Science

1 course selected from:
- ANSC 101 Introduction to Animal Science
- ANSC 230 Animal Feeds and Nutrition

1 course selected from:
- CHEM 107 General Chemistry for Applied Sciences
- CHEM 111 General Chemistry I

1 course selected from:
- CHEM 108 Organic Chemistry for Applied Sciences
- CHEM 112 General Chemistry II

6-8 units selected from:
- ABUS 231 Computer Applications in Agriculture
- ABUS 261 Farm Accounting
- BIOL 161 Principles of Ecological, Evolutionary, and Organismal Biology
- BIOL 162 Principles of Cellular and Molecular Biology
- BIOL 163 Principles of Physiology and Development
- GEOG 101W Physical Geography (W)
- GEOS 265 Soils and Surficial Processes
- PHYS 202A General Physics I
- PHYS 204A Physics for Students of Science and Engineering: Mechanics
- PSSC 160 West Coast Crop Production
- PSSC 266 California Orchard Production and Management
- PSSC 274 Greenhouse Management
- RHPM 240 Outdoor Recreation Systems
Upper-Division Core: 24-25 units
3 courses required:
AGRI 331 Agricultural Ecology
AGRI 482W Agricultural Issues (W)
AGRI 490W Agricultural Experimental Research (W)

1 course selected from:
PSSC 356 Soil Quality and Health
PSSC 453 Soil Fertility and Plant Nutrition

1 course selected from:
BIOL 369 Advanced Plant Biology
BIOL 414 Plant Physiology
BIOL 448 Plant Diversity and Identification
PSSC 459 Crop Physiology

1 course selected from:
ABUS 321 Agribusiness Management
ABUS 341 Natural Resource Economics
ABUS 464 Farm and Ranch Appraisal

Prerequisites: ABUS 101.

1 course selected from:
AGRI 432 Holistic Management
PSSC 441 Principles of Integrated Pest Management

2 units selected from:
PSSC 309A Directed Work in Field and Row Crops
PSSC 309B Directed Work in Vegetable Crops
PSSC 389 Internship in Plant and Soil Science

Major Option Course Requirements: 21-25 units
The following courses, or their approved transfer equivalents, are required dependent upon the option chosen. Students must select one of the following options for completion of the major course requirements. Use the links below to jump to your chosen option.

The Option in Crops and Horticulture
The Option in Land and Soil Resource Management

The Option in Crops and Horticulture: 23-25 units
This option prepares students to manage agricultural enterprises for the production of food, feed, fuel, fiber, and ornamental crops. It comprises protection of these crops and resources against pests (insects, diseases, weeds, and vertebrates) and stewardship of their natural resources (soil, water, air, and biota). The option emphasizes sustainable land use and crop production practices. This option equips students with skills to competitively pursue graduate education or other professional opportunities in agricultural consulting, production, conservation, research, and regulation.

2 courses required:
AGRI 305 Agricultural Genetics
PSSC 353 Plant Protection Materials, Methods, and Regulations

Crop Production
2 courses selected from:
AGE 360  Irrigation
PSSC 345  Horticultural Therapy
PSSC 361  Production of Annual Crops
PSSC 363  Forage Crops
PSSC 365  Sustainable Vegetable Crop Production
PSSC 366  Fruit and Nut Production

Agricultural Pests and Management
1 course selected from:
BIOL 446  Plant Pathology
PSSC 340  Economic Entomology
PSSC 343  Introduction to Weed Science

Crops and Horticulture Electives
8-9 units selected from:
To fulfill the requirements of this option, select additional upper-division courses from the major core, option, listed courses below, or other courses in consultation with your advisor. Students may elect to take either PSSC 390 or PSSC 392 to satisfy up to 3 units of upper-division electives in this option. Check with your advisor on which one is most appropriate for your career path.
AGRI 301  California Agriculture Seminar
PSSC 305  Introduction to Wines
PSSC 390  Food Forever: Comparisons of Sustainable Food Production Systems

OR (the following course may be substituted for the above)
PSSC 392  World Food and Fiber Systems
"AEPS - Plant Sciences. Name Change for Signatures" History

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TO: Academic Senators

2022-25 CATALOG REVIEW: Following the practice implemented in previous years, summaries of all course or catalog proposals sent by the Academic Senate Curriculum Committee to the Senate for consideration are posted on the web. Every senator is expected to review these proposals as well as the accompanying recommendations of the Curriculum Committee.

2022-25 catalog proposals submitted by the following departments/programs and identified in their respective college summary in the Curriculum Handbook:

**College of Agriculture, Food and Environmental Sciences**
Agribusiness Department
Agricultural Education and Communication Department
BioResource and Agricultural Engineering Department
Experience Industry Management Department
Food Science and Nutrition Department
Natural Resources Management and Environmental Science Department
Plant Sciences Department (formerly Horticulture and Crop Sciences Department)
Wine and Viticulture Department

**College of Architecture and Environmental Design**
Architectural Engineering Department
Construction Management Department

**College of Engineering**
Civil and Environmental Engineering Department
Computer Engineering Department
Computer Science and Software Engineering Department
Electrical Engineering Department
General Engineering Program
Mechanical Engineering Department

**College of Liberal Arts**
Communication Studies Department
English Department
Ethnic Studies Department
Graphic Communication Department
History Department
Music Department
Philosophy Department
Political Science Department
Social Sciences Department
Theatre and Dance Department
World Languages and Cultures Department

**College of Science and Mathematics**
Biological Sciences Department
Liberal Studies Department
Mathematics Department
School of Education
Statistics Department

**Orfalea College of Business**
Accounting and Law Area
Finance Area
Graduate Programs
Industrial Technology and Packaging Area
Management, HR and Information Systems Area

**University Honors Program**
**University Studies**

To view a college summary, go to the online Curriculum Handbook. Click on Status of Proposals, scroll to 2022-25 Catalog Proposals - College Summaries' section, select the link for the appropriate college.

To view the proposal for a course or program, go to My Cal Poly Portal - Academics tab - Curriculum Management portlet. Select the Course Inventory Management link to search for a course; select the Program Management link to search for a program.

Issues, concerns, and questions regarding a curriculum proposal should be directed to Greg Bohr, chair of the Academic Senate Curriculum Committee. If the concern is strong enough, any senator may request an item to be removed from the Consent Agenda by April 26, 2022.

Pursuant to the curriculum appeals process adopted by the Academic Senate on May 4, 2010, "Items removed from the Consent Agenda will be placed on the Senate agenda as discussion items. The Senate Chair (or designee) will invite representatives from the concerned departments and the Academic Senate Curriculum Appeals Committee to be present at the meetings where pulled proposals will be discussed. Following discussion in the Senate, the Academic Senate Curriculum Appeals Committee will make the final decision to approve, disapprove, or return the items to committee (at any level) for further development. Items not removed from the Consent Agenda are considered approved on the meeting date of the Consent Agenda."
RESOLUTION ON UFPP 11.4.2 DEPARTMENTAL ROLE IN THE SELECTION PROCESS FOR CHAIRS AND HEADS

Impact on Existing Policy: Policy enacted by this resolution includes expressions of already established policy based on AM-20171030 in UFPP Appendix. Policy in 11.4.1 was established in AS-934-22 and the editorial revisions attached here supersede that language for UFPP 2022-23.¹

WHEREAS, Departmental voting procedures for recommendations to deans for internal department chairs and heads are limited by policy established in AM-20171030: Settlement on Lecturer Voting; and

WHEREAS, These policies on voting procedures are expressed in “Cal Poly Election Process for Internal Department Heads/Chairs” available on the Academic Personnel website; and

WHEREAS, The scope of the ways departments work with deans in the selection of departmental leadership should be clear to faculty and administration; and

WHEREAS, The nature of acting and interim chair and head appointments should be clear to faculty and administration; and

WHEREAS, University Faculty Personnel Policies (UFPP) is the governing document for faculty personnel policies at Cal Poly with its appendix containing administrative memos, therefore be it

RESOLVED: The policy contained in UFPP 11.4.2 Departmental Role in the Selection Process for Chairs and Heads be placed in UFPP Academic Year 2022-23, along with other revisions in 11.4.1, and be it further

RESOLVED: “Cal Poly Election Process for Internal Department Heads/Chairs” be placed in UFPP Appendix, and be it further
RESOLVED: By Fall 2022 Colleges revise chapter 11 of their personnel policy documents as needed to conform with 11.4.

Proposed by: Academic Senate Faculty Affairs Committee
Date: [Sometime in 2022]

(1) Describe how this resolution impacts existing policy on educational matters that affect the faculty. Examples include curricula, academic personnel policies, and academic standards.

(2) Indicate if this resolution supersedes or rescinds current resolutions.

(3) If there is no impact on existing policy, please indicate NONE.
EXECUTIVE SUMMARY: Academic Senate Faculty Affairs Committee (FAC) proposes placing into UFPP policies on the departmental role in the selection of chairs or heads, including existing policy on requirements for lecturer participation in any departmental voting procedures for such recommendations as well as policies pertaining to appointment of acting and interim chairs and heads.

BACKGROUND: The Academic Senate Faculty Affairs Committee (FAC) is a standing Senate committee with representation from each college, the library and professional consultative services, Academic Affairs, and a student representative. FAC employs a streamlined process for approval of updates to University Faculty Personnel Policies (UFPP) including consultation with faculty affected by proposed changes and clear identification of which policy documents have been superseded by a proposed change. This process uses Academic Senate resolutions to establish new policy, revise existing policy, or substantially reformulate existing policy.

**Summary**

Administrative memos establishing university personnel policies reside in the UFPP Appendix, updated annually and available on the Academic Personnel website. In Fall 2017 a no-fault settlement to a grievance established university level policy on departmental voting procedures concerning the advising of deans in the appointments of internally selected chairs and heads. This policy required such elections to include 12.12 (3-year) faculty along with tenure-line faculty equivalently in such elections, and required other lecturers to have a separate advisory vote. An email to the faculty on this matter is in UFPP Appendix as AM-20171030: Settlement on Lecturer Voting. The document “Cal Poly Election Process for Internal Department Heads/Chairs” from February 8, 2018 expresses these requirements in policy form, and therefore should be placed in the UFPP Administrative Memos appendix as AM-20180208.

FAC proposes placing these existing policies into UFPP 11.4.2, along with other related policies concerning the departmental role in the selection of department chairs and heads. These other policies cover acting and interim chair and head appointments, external searches for chairs and heads, and the role of faculty, including lecturers, in these procedures.

**Impact on Existing Policy**

The policies concerning voting procedures contained in UFPP 11.4.2 expresses current policy and practice at Cal Poly, and so there is no impact on existing policy by placing these policies in UFPP. College and library personnel policies must conform with the policies in 11.4.2 concerning acting and interim chair and head appointments.
**UFPP 11.4.2 Departmental Role in the Selection Process for Chairs and Heads**

**Spring 2022**

<table>
<thead>
<tr>
<th>Implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td>College and department personnel policies concerning voting procedures for recommendations to the dean of internal chair/head candidates, and any other policies about departmental roles in selections of chairs and heads need to be updated to cite UFPP 11.4.2.</td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>Consultation with Faculty Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consultation on this matter is concurrent with its placement on the Academic Senate Executive Committee and main meeting agendas.</td>
</tr>
</tbody>
</table>

What follows is the proposed text of 11.4.2 contained within the entirety of subchapter 11.4, and the administrative documents to be placed in UFPP Appendix.

The policies in 11.4.1 and 11.4.3 were recently passed by the Senate and endorsed by Pres. Armstrong. The proposed policies for 11.4.2 are best seen in the context of the whole of 11.4, and so we provide the entirety of that subchapter here. Policy in 11.4.1. includes cross references to 11.4.2 and some editorial revisions.
11.4. Department Governance

11.4.1. Department Leadership

11.4.1.1. Policy in 11.4.1 established by AS-934-22.

11.4.1.2. Department chairs and heads are faculty who have administrative functions as part of their assignment. Department chairs and heads serve at the pleasure of the dean. Appointment of chairs and heads are made by the dean after consultation with the faculty, the provost, and the president. Consultation with the faculty includes the departmental selection processes contained in 11.4.2.

11.4.1.3. In exceptional cases MPP administrators may be appointed as chairs or heads on an acting or interim basis. Also, department chairs and heads may be appointed to MPP positions on an interim basis. Acting and interim chair and head appointments are covered further in 11.4.2.

11.4.1.4. Department chairs receive three-year renewable appointments. The definite term of chair appointments allows for a rotation of department leadership providing new leadership, fresh ideas, shorter term action plans, and the opportunity for more faculty to rotate through this leadership role.

11.4.1.5. Department heads receive appointments over an indefinite period, providing long-term continuity of leadership within their department and college.

11.4.1.6. Deans determine whether a department chair or department head appointment best suits the needs of the department and college.

11.4.1.7. Department chairs and heads may have academic year appointments, 12-month appointments. The nature of the appointment depends on the nature of their duties in the academic year and during summer, as determined by the dean, and are compensated accordingly.

11.4.1.8. The responsibilities and priorities of department chairs and heads will vary across colleges, departments, and individuals. Departments have varying models of how the responsibilities listed below will be accomplished. Although there are many items listed among responsibilities of department chairs and heads, some of these items may be delegated to other faculty and staff depending on the size of the department, organizational structure, support staff and the fraction of the assignment of department chairs or heads that is dedicated to administrative duties. The college deans will help the department chairs and heads understand the prioritization of these duties in conjunction with the college and department’s vision and goals.

11.4.1.9. Academic Personnel maintains a document describing in detail the responsibilities and priorities of department chairs and heads, including the following areas of management and leadership for the department:

- Administration of department affairs
- Budget development and administration
- Department personnel
- Academic programs and curriculum
- Student engagement and success
- Advocacy for the department’s interests
- Community engagement and development activities

11.4.1.10. Department chairs and heads are subject to annual administrative review. This administrative review is wholly distinct from faculty evaluations that are
covered in UFPP 4-6. The administrative review of department chairs and heads is conducted by the dean.

11.4.2. **Departmental Role in the Selection Process for Chairs and Heads**

11.4.2.1. Policy in 11.4.2 established by [cite Senate action] and AM-20171030, editorially revised in [AM-20180208].

11.4.2.2. Processes conducted within a department for selection of candidates for department chairs and heads are advisory, providing recommendations from the department faculty to the dean, and shall be specified in department or college faculty personnel policy documents. Departments may recommend to the dean one or more candidates for chair or head.

11.4.2.3. The departmental practice for selecting candidates for department chairs or heads shall involve voting among the department faculty incorporating the voting requirements outlined below. These voting requirements represent a minimum; departments may modify their department chair or head recommendation policies through the joint governance process approved by the dean.

11.4.2.3.1. All 12.12 (3-year) lecturers, including counselors and librarians, with an appointment in the academic term of the vote will be eligible to participate in the vote to recommend a department chair or head, with a full vote in their department voting process. Nothing in the balloting process will differentiate the three-year lecturers' vote from tenured and tenure-track faculty votes for department chair or head recommendations.

11.4.2.3.2. All other lecturers will be granted an advisory vote. These advisory votes will be differentiated and summarized separately from the votes of the 12.12 (3-year) lecturers, tenured faculty, and tenure-track faculty.

11.4.2.3.3. Lecturers shall be notified regarding the department voting process in the same manner as all tenured and tenure-track faculty.

11.4.2.3.4. Lecturers eligible to cast a vote or an advisory vote shall be afforded the same opportunity as tenured and tenure-track faculty to attend regularly scheduled department meetings when department chair or head recommendation balloting is scheduled.

11.4.2.4. The results of all departmental voting shall be included in the department’s basis for recommendations of suitable candidates from the department to the dean.

11.4.2.5. An acting chair or head may be appointed from faculty within the department, from faculty not in the affected department, or from administrators. Acting chairs and heads are intended to serve for short periods when the current chair or head is unable to serve (e.g., while on sabbatical or leave), or until the dean makes a standard appointment of a department chair or head (covered in 11.4.1) or interim appointment. Since appointments of acting chairs and heads can be time sensitive and may occur on occasions when it is not feasible to consult with the affected department ahead of the appointment, deans may use their discretion about whether or not to consult with department faculty in appointment of an acting chair or head.

11.4.2.6. An interim chair or head may be appointed from faculty within the department, from faculty not in the affected department, or from administrators. Interim
Chairs and heads are intended to serve until the dean makes a standard appointment of a department chair or head (as covered in 11.4.1). The initial appointment of an interim chair or head shall be for a defined period of time, renewed as needed. For appointments of interim chairs or heads, the dean shall solicit feedback from all department faculty, including all lecturers with an appointment in the academic term when the feedback is collected, for use in the dean’s decision about the interim chair or head appointment.

11.4.2.7. In exceptional cases the college may undergo a standard faculty recruitment to hire a department chair or head. In addition to all the normal aspects of a faculty recruitment, the chair of the search committee shall solicit feedback from all lecturers with an appointment in the academic term of the search; these lecturers will be granted a full advisory vote, which will be presented to the faculty search committee. This advisory vote shall be included in the basis for recommendations of suitable candidates from the search committee to the dean. The result of a successful search for a new faculty member to serve as chair or head shall be a standard chair or head appointment as covered in 11.4.1.

11.4.3. Changes in Department Leadership Models
11.4.3.1. Policy in 11.4.3 established by AS-935-22, superseding AS-801-15.
11.4.3.2. The dean has discretion over the type of department chair or head appointments appropriate for the college and department.
11.4.3.3. Changes in department leadership models shall involve a consultative process with department faculty and staff.
11.4.3.4. Colleges shall specify in their personnel policy documents the process for implementing such a change in departmental leadership.
In accordance with the Campus Administrative Manual (CAM), the appointment of a department head/chair is made by the dean after consultation with the faculty of the department, the Provost and the President. Chairs will be appointed for a fixed term and Head appointments will normally continue so long as they are satisfactory to the appointee and to the dean. The department head/chair serves at the pleasure of the dean.

Each department shall continue to follow their department practice to conduct internal Department Head/Chair elections while incorporating the voting requirements outlined below. Departments may update their policy through its respective joint governance process, but the new process must include the requirements listed below.

1. All 12.12 (3-year) lecturers, including counselors and librarians, with an appointment in the academic quarter of the vote will be eligible to participate in the vote to recommend a department chair, with a full vote in their department voting process. Nothing in the balloting process will differentiate the three-year lecturers’ vote from tenured and tenure-track faculty votes for department chair recommendations.

2. All other lecturers will be granted an advisory vote. These advisory votes will be differentiated and summarized separately from the votes of the 12.12 (3-year) lecturers, tenured faculty, and tenure-track faculty.

3. The above voting terms represent a minimum; departments may modify their department chair selection policies through the joint governance process.

4. Lecturers shall be notified regarding the department voting process in the same manner as all tenured and tenure-track faculty.

5. Lecturers eligible to cast a vote or an advisory vote shall be afforded the same opportunity as tenured and tenure-track faculty to attend regularly scheduled department meetings when department chair balloting is scheduled.

6. In the event the department conducts a search for a department chair that is not from the department, the faculty recruitment process as described in the Procedure for Recruiting Tenure-Track Faculty (https://content-calpoly-edu.s3.amazonaws.com/academic-personnel/1/PDF/ProcedureforRecruitingTenure-TrackFaculty_%283-2017%29.pdf) will be used. In this case, the chair of the search committee shall solicit feedback from all lecturers employed during the quarter of the search; these lecturers will be granted a full advisory vote, which will be presented to the faculty search committee.
11.4. Department Governance

11.4.1. Department Leadership

11.4.1.1. Policy in 11.4.1 established by AS-934-22.

11.4.1.2. Department chairs and heads are faculty who have administrative functions as part of their assignment. Department chairs and heads serve at the pleasure of the dean. Appointment of chairs and heads are made by the dean after consultation with the faculty, the provost, and the president. Consultation with the faculty includes the departmental selection processes contained in 11.4.2.

11.4.1.3. In exceptional cases MPP administrators may be appointed as chairs or heads on an acting or interim basis. Also, department chairs and heads may be appointed to MPP positions on an interim basis. Acting and interim chair and head appointments are covered further in 11.4.2.

11.4.1.4. Department chairs receive three-year renewable appointments. The definite term of chair appointments allows for a rotation of department leadership providing new leadership, fresh ideas, shorter term action plans, and the opportunity for more faculty to rotate through this leadership role.

11.4.1.5. Department heads receive appointments over an indefinite period, providing long-term continuity of leadership within their department and college.

11.4.1.6. Deans determine whether a department chair or department head appointment best suits the needs of the department and college.

11.4.1.7. Department chairs and heads may have academic year appointments, 12-month appointments. The nature of the appointment depends on the nature of their duties in the academic year and during summer, as determined by the dean, and are compensated accordingly.

11.4.1.8. The responsibilities and priorities of department chairs and heads will vary across colleges, departments, and individuals. Departments have varying models of how the responsibilities listed below will be accomplished. Although there are many items listed as among responsibilities of the department chairs’ and heads’ responsibilities, some of these items may be delegated to other faculty and staff depending on the size of the department, organizational structure, support staff and the fraction of the assignment of department chair’s or head’s assignment that is dedicated to administrative duties. The college deans will help the department chairs and heads understand the prioritization of these duties in conjunction with the college and department’s vision and goals.

11.4.1.9. Academic Personnel maintains a document describing in detail the responsibilities and priorities of department chairs and heads, including the following areas of management and leadership for the department:
11.4.1. Department chairs and heads are subject to annual administrative review. This administrative review is wholly distinct from faculty evaluations that are covered in UFPP 4-6. The administrative review of department chairs and heads is conducted by the dean.

11.4.2. Departmental Role in the Selection Process for Chairs and Heads

11.4.2.1. Policy in 11.4.2 established by [cite Senate action] and AM-20171030, editorially revised in [AM-20180208].

11.4.2.2. Processes conducted within a department for selection of candidates for department chairs and heads are advisory, providing recommendations from the department faculty to the dean, and shall be specified in department or college faculty personnel policy documents. Departments may recommend to the dean one or more candidates for chair or head.

11.4.2.3. Any departmental practice for selecting candidates for department chairs or heads that involves voting among the department faculty shall incorporating the voting requirements outlined below. These voting requirements represent a minimum; departments may modify their department chair or head selection recommendation policies through the joint governance process approved by the dean.

11.4.2.3.1. All 12.12 (3-year) lecturers, including counselors and librarians, with an appointment in the academic quarter term of the vote will be eligible to participate in the vote to recommend a department chair or head, with a full vote in their department voting process. Nothing in the balloting process will differentiate the three-year lecturers’ vote from tenured and tenure-track faculty votes for department chair or head recommendations.

11.4.2.3.2. All other lecturers will be granted an advisory vote. These advisory votes will be differentiated and summarized separately from the votes of the 12.12 (3-year) lecturers, tenured faculty, and tenure-track faculty.

11.4.2.3.3. Lecturers shall be notified regarding the department voting process in the same manner as all tenured and tenure-track faculty.

11.4.2.3.4. Lecturers eligible to cast a vote or an advisory vote shall be afforded the same opportunity as tenured and tenure-track faculty to attend regularly scheduled
department meetings when department chair or head recommendation balloting is scheduled.

11.4.2.4. The results of all departmental voting shall be included in the department’s basis for recommendations of suitable candidates from the department to the dean.

11.4.2.5. An acting chair or head may be appointed from faculty within the department, from faculty not in the affected department, or from administrators. Acting chairs and heads are intended to serve for short periods when the current chair or head is unable to serve (e.g., while on sabbatical or leave), or until the dean makes a standard appointment of a department chair or head (covered in 11.4.1) or interim appointment. Since appointments of acting chairs and heads can be time sensitive and may occur on occasions when it is not feasible to consult with the affected department ahead of the appointment, deans may use their discretion about whether or not to consult with department faculty in appointment of an acting chair or head.

11.4.2.5.11.4.2.6. An interim chair or head may be appointed from faculty within the department, from faculty not in the affected department, or from administrators. Interim chairs and heads are intended to serve until the dean makes a standard appointment of a department chair or head (as covered in 11.4.1). The initial appointment of an interim chair or head shall be for a defined period of time, renewed as needed. For renewal of appointments of interim chairs or heads extending beyond the academic year following the appointment, the dean shall solicit feedback from all department faculty, including all lecturers with an appointment in the academic term employed when the feedback is collected, for use in the dean’s decision about the interim chair or head appointment.

11.4.2.6.11.4.2.7. In exceptional cases the college may undergo a standard faculty recruitment to hire a department chair or head. In addition to all the normal aspects of a faculty recruitment, the chair of the search committee shall solicit feedback from all lecturers with an appointment in the academic term employed during the quarter of the search; these lecturers will be granted a full advisory vote, which will be presented to the faculty search committee. This advisory vote shall be included in the basis for recommendations of suitable candidates from the search committee to the dean. The result of a successful search for a new faculty member to serve as chair or head shall be a standard chair or head appointment as covered in 11.4.1.

11.4.3. Changes in Department Leadership Models

11.4.3.1. Policy in 11.4.3 established by AS-935-22, superseding AS-801-15.

11.4.3.2. The dean has discretion over the type of department chair or head appointments appropriate for the college and department.
11.4.3.3. Changes in department leadership models shall involve a consultative process with department faculty and staff.
11.4.3.4. Colleges shall specify in their personnel policy documents the process for implementing such a change in departmental leadership.
WHEREAS, For nearly 50 years the Statistics Department has offered a BS Statistics degree and, in 1973 was among the first programs in the nation to offer an undergraduate degree in statistics; and

WHEREAS, Demand for statisticians with advanced degrees vastly outstrips supply, both in California and nationwide; and

WHEREAS, Cal Poly’s Academic Plan Consultative Committee reviewed the summary statement for the new Master of Science in Statistics degree; and

WHEREAS, Both the Cal Poly Provost and the CSU Board of Trustees approved the addition of the new Master of Science in Statistics degree to Cal Poly’s academic plan; and

WHEREAS, The department developed a new degree program proposal (see attached) using the template required by the Chancellor’s Office; and

WHEREAS, This new degree program proposal has been approved by the Statistics department curriculum committee, the College of Science and Mathematics curriculum committee, and the Academic Senate Curriculum Committee; therefore be it

RESOLVED: That the Academic Senate of Cal Poly approves the new degree program for final review by the Chancellor’s Office.

Proposed by: Andrew Schaffner, Kelly Bodwin, and John Walker on behalf of the Statistics Department Faculty
Date: March 29, 2022
NEW DEGREE PROPOSAL

Master of Science in Statistics

March 2022
CSU DEGREE PROPOSAL: MS Statistics
Faculty Check List
(please submit with program proposal)

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

√__ Board of Trustees Academic Master Plan approval date

√__ WSCUC response to Substantive Change Screening Form is attached

N/A__ Copies of any contracts or agreements made between parties with an interest in operating the proposed program. Other entities may include academic departments, academic institutions, foundations, vendors or similar. Please include a copy of the agreement and an e-mail or other evidence that the campus attorney has approved the agreement.

√__ The total number of units required for graduation is specified (not just the total for the major):

N/A__ a proposed bachelor’s program requires no fewer than 120 semester units

N/A__ any proposed bachelor’s degree program with requirements exceeding 120 units must request an exception to the 120 semester unit limit policy

√__ all units required for degree completion must be included in the total units required for the degree. Any proficiencies required to graduate that are beyond what is included in university criteria admission criteria must be assigned unit values and included in the total unit count.

N/A__ Title 5 minimum requirements for bachelor’s degree have been met, including:

N/A__ minimum number of units in major (BA 24 semester units, BS 36 semester units)

N/A__ minimum number of units in upper-division (BA 12 semester units, BS 18 semester units)

√__ 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.

N/A__ For self-support programs:
 (in conformance with EO 1099 and EO 1102)
specification of how all required EO 1099 self-support criteria are met

the proposed program does not replace existing state-support courses or programs

academic standards associated with all aspects of such offerings are identical to those of comparable state-supported CSU instructional programs

explanation of why state funds are either inappropriate or unavailable

a cost-recovery program budget is included*

student per-unit cost is specified

total cost for students to complete the program is specified

* Basic Cost Recovery Budget Elements
   (Three to five year budget projection)

Student per-unit cost
Number of units producing revenue each academic year
Total cost a student will pay to complete the program

Revenue - (yearly projection over three years for a two-year program; five years for a four-year program)
   Student fees
   Include projected attrition numbers each year
   Any additional revenue sources (e.g., grants)

Direct Expenses
   Instructional costs – faculty salaries and benefits
   Operational costs – (e.g., facility rental)
   Extended Education costs – staff, recruitment, marketing, etc.
   Technology development and ongoing support (online programs)

Indirect Expenses
   Campus partners
   Campus reimbursement general fund
   Extended Education overhead
   Chancellor’s Office overhead

*Additional line items maybe added based on program characteristics and needs.
1. Program Type
   a. State-Support
   c. Delivery Format: Fully face to face
e. 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 Statistics

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

      March 24, 2020

d. Term and academic year of intended implementation:

      Fall 2023

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 Statistics, College of Science and Math

g. Name, title, and rank of the individual(s) primarily responsible for drafting the proposed degree major program.

      Dr. Andrew Schaffner, Professor (aschaffn@calpoly.edu)
      Dr. Kelly Bodwin, Assistant Professor (kbodwin@calpoly.edu)
      Dr. John Walker, Professor (jwalker@calpoly.edu)
      Dr. Dennis Sun, Assistant Professor (dsun09@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.

See: Supplement 4: Dean’s Office Letter of Support

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

See Supplement 1:
(a) Statistics Department Curriculum Committee approval
(b) College of Science and Math Curriculum Committee approval and Academic Senate Curriculum Committee approval
(c) Academic Senate Resolution
(d) Presidential approval

j. Substantive Change:
The WASC Senior College and University Commission Substantive Change Manual states: **Institutions must submit a Substantive Change Screening Form for all new degree programs to determine if a review is necessary.** Please include a copy of the response to the Substantive Change Screening form.

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

The proposed program was submitted for a substantive change screening. WSCUC determined that the program was not subject to WSCUC Substantive Change Review.

See Supplement 7: WSCUC Response to Substantive Change Screening

k. Proposed Classification of Instructional Programs and CSU Degree Program Code

Although the Chancellor’s Office assigns CIP Codes, campuses are invited to suggest one CSU degree program code and one corresponding CIP code. If an appropriate CSU code does not appear on the system-wide list at: [http://www.calstate.edu/app/resources.shtml](http://www.calstate.edu/app/resources.shtml) you can search CIP 2020 at [http://nces.ed.gov/ipeds/cipcode/](http://nces.ed.gov/ipeds/cipcode/) to identify the code that best matches the proposed degree program. The Classification of Instructional Programs (CIP) is a National Center for Education Statistics (NCES) publication that provides a numerical classification and standard terminology for secondary and postsecondary instructional programs. The CSU degree program code (based on old HEGIS codes) and CIP code will be assigned when the program is approved by the Chancellor.

27.0501 (Statistics – General)
3. Program Overview and Rationale

a. Provide a brief descriptive overview of the program citing its 1) purpose and strengths, 2) fit with the institutional mission or institutional learning outcomes, and 3) the compelling reasons for offering the program at this time.

The purpose of the Masters of Science in Statistics program is to provide advanced training to students preparing for careers in statistics and data analysis. The proposed program consists of advanced coursework that lays conceptual and methodological foundations, as well as applied skills such as statistical computing. The degree also includes a significant amount of independent research, including consulting with external clients and collaborating on interdisciplinary projects across campus. This is a unique program that fits Cal Poly’s “Learn by Doing” mission, giving students hands-on experience with applying statistical theory to real problems. Students will be partners with faculty in building cross-campus, interdisciplinary collaborations, which will benefit both students and faculty---not just in the Statistics department but across the entire university.

One notable strength of the proposed program is the faculty. The Statistics Department at Cal Poly is renowned nationally: faculty regularly publish work and present at major conferences, and four of our faculty members have been elected Fellows of the American Statistical Association. It is one of only two standalone Statistics departments in the CSU, with 20 tenure-track faculty members whose training, research, and expertise is specifically in statistics and data analysis. Thus, we are well-positioned to train students for the growing number of jobs in these areas.

In 2019, the College of Science and Math contracted Hanover Research to conduct market research based on our preliminary proposal for a Masters program. It found that the demand in the job market for statisticians with advanced degrees vastly outstrips the supply, both in California and nationwide. The gap is projected to widen over the next 10 years. Hanover Research concluded that the market was highly favorable for a Masters program like ours.

Although the Statistics Department already offers an undergraduate degree in Statistics and a cross-disciplinary studies minor in Data Science, many data-driven jobs now require advanced degrees. Our proposed Master’s program would equip students with the skills and qualifications necessary to step directly into high-level data analysis jobs. This opportunity would greatly benefit current undergraduates at Cal Poly, as well as provide an option for students in the Central Coast region who completed their undergraduate degree elsewhere.

b. Provide the proposed catalog description. The description should include:

i. a narrative description of the program

The Masters of Science in Statistics program is designed to provide advanced training to students preparing for careers in statistics and data analysis. The program consists of coursework that lays the conceptual and methodological foundations of the discipline, as well as consulting and research experiences.
The program is intended for students with an undergraduate major or minor degree in Statistics. It requires completion of a core curriculum (covering theory and applications), a thesis, and directed electives for a total of 45 units.

ii. admission requirements:

All students must have taken the equivalent of:
- MATH 206 (linear algebra),
- MATH 241 (multivariable calculus),
- CSC 101 (introductory computer science), and
- STAT 302 (second course in statistics).

In addition, students are expected to have taken the equivalent of:
- STAT 323 (design of experiments)
- STAT 331 (statistical computing in R)
- STAT 334 (applied linear models)

Students without these courses may be admitted conditionally, taking up to 12 units (not applicable to the degree) in these areas to make up for any deficiencies.

iii. 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 beyond what is included in university admission criteria

- Core Courses (37 units)*
  - STAT 425: Probability Theory (4 units)
    Prerequisites: MATH 206, MATH 241, STAT 302
    (all admissions requirements)
  - STAT 426: Estimation and Sampling Theory (4 units)
    Prerequisites: STAT 425
  - STAT 427: Mathematical Statistics (4 units)
    Prerequisites: STAT 426
  - STAT 550: Generalized Linear Models (4 units)
    Prerequisites: STAT 334, STAT 427
  - STAT 551: Statistical Learning with R (4 units)
    Prerequisites: STAT 331 or 531, STAT 334, STAT 305 or STAT 350
  - STAT 566: Graduate Consulting Practicum (2 units)
    Prerequisites: STAT 466
  - STAT 590: Graduate Seminar (3 units)
  - STAT 599: Thesis (8 units)

- Elective Courses (8 units)
  - STAT 541: Advanced Statistical Computing with R (4 units)
    Prerequisites: STAT 331, STAT 334, STAT 426
○ STAT 543: Advanced Design and Analysis of Experiments (4 units)
  Prerequisites: STAT 323 or 523, STAT 334 or 534
○ STAT 545: Applied Stochastic Processes (4 units)
  Prerequisites: MATH 206 or MATH 244, STAT 426
○ STAT 500: Independent Study (1-4 units)
  Prerequisites: Consent of graduate advisor
○ CSC 566: Topics in Advanced Data Mining (4 units)
  Prerequisites: CSC 466
○ CSC 582: Introduction to Natural Language Processing (4 units)
  Prerequisites: CSC 466
○ MATH 550: Real Analysis (4 units)
  Prerequisites: Consent of instructor

● Prerequisite Courses (0-12 units, depending on student background)
  ○ STAT 323: Design and Analysis of Experiments I (4 units)
  ○ STAT 331: Statistical Computing with R (4 units)
  ○ STAT 334: Applied Linear Models (4 units)

* Students who complete 400-level Core Courses as part of their Bachelor’s Degree or Minor Degree may substitute any 500-level elective course, or any approved 400-level elective course. (See Supplement 2: Approved Electives for a list of approved courses.)

iv. total units required to complete the degree:

45

v. if a master’s degree, catalog copy describing the culminating experience requirement(s)

This degree culminates in completion of a thesis, which gives students experience in completing an original research project. The findings of this thesis should be of a quality commensurate with publication in a peer-reviewed scientific journal.

4. Curriculum

(These requirements conform to the revised 2013 WASC Handbook of Accreditation)

a. These program proposal elements are required:

  • Institutional learning outcomes (ILOs)
  • Program learning outcomes (PLOs)
  • Student learning outcomes (SLOs)

Describe outcomes for the 1) institution, 2) program, and for 3) student learning. Institutional learning outcomes (ILOs) typically highlight the general 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 graduates from a specific program. PLOs are more narrowly focused than
ILOs. Student learning outcomes (SLOs) clearly convey the specific and measurable knowledge, skills, and/or behaviors expected and guide the type of assessments to be used to determine if the desired level of learning has been achieved.

(WASC 2013 CFR: 1.1, 1.2, 2.3)

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, respect for diversity, and awareness of issues related to sustainability
7. Engage in lifelong learning

Program Learning Outcomes:

After completing the MS Statistics, students will be able to

1. Demonstrate mastery of core statistical theory;
2. Demonstrate proficiency in statistical methodology and data analysis;
3. Select, justify, and apply appropriate inferential and predictive methods;
4. Responsibly interpret results and output of statistical analyses;
5. Communicate effectively (written and oral) and organize/manage projects in collaborative settings (within and between disciplines);
6. Write code for statistical applications in one or more languages;
7. Gather and manage data from a variety of sources;
8. Collaborate with researchers and clients to solve data-oriented problems that arise in other disciplines; and,
9. Conduct independent learning and research.

Student Learning Outcomes:

All students will

1. Serve the needs of one or more research clients or collaborators by identifying, implementing, and mathematically defending the use of appropriate statistical methodology;
2. Practice self-learning skills to maintain currency in statistical and associated computing methodology through reading, discussion, and peer presentations of current practices as reflected in statistical literature;
3. Build and evaluate inferential and predictive models to analyze data with both numeric and categorical responses using statistical programming; and
Master of Science in Statistics (MS-STAT) SLO PLO Mapping Matrix.

<table>
<thead>
<tr>
<th>SLO 1</th>
<th>PLO 1</th>
<th>PLO 2</th>
<th>PLO 3</th>
<th>PLO 4</th>
<th>PLO 5</th>
<th>PLO 6</th>
<th>PLO 7</th>
<th>PLO 8</th>
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<td>SLO 3</td>
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</table>

b. These program proposal elements are required:

- Comprehensive Assessment Plan addressing all assessment elements
- Matrix showing where student learning outcomes are introduced (I), developed (D), and mastered (M)

Key to program planning is creating a comprehensive assessment plan addressing multiple elements, including a strategy and tool to assess each student learning outcome. SLOs operationalize the PLOs and serve as the basis for assessing student learning in the major. Constructing an assessment matrix, showing the relationship between all assessment elements, is an efficient and clear method of displaying all assessment plan components.

Creating a curriculum map matrix, identifying the student learning outcomes, the courses where they are found, and where content is “introduced,” “developed,” and “mastered” insures that all student learning outcomes are directly related to overall program goals and represented across the curriculum at the appropriate times. Assessment of outcomes is expected to be carried out systematically according to an established schedule, generally every five years.

Comprehensive Program Assessment Plan:

The Statistics 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 Statistics Department faculty. 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 Statistics department will use the following as direct assessment of the master’s program:

- Embedded questions in exams linked to specific SLOs/PLOs.
- Homework assignments, projects, oral presentations, statistical consulting, and written reports. 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:

Progress through the MS degree provides a cumulative experience beginning with foundational coursework and culminating with implementation of a research thesis. Students can experience this milestone through completion of the research thesis course (STAT 599) and publication of a written thesis report in a digital archive and/or peer review journal. 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 Institutional 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.
- Postgraduate employer/advisory survey: External indicators can serve as excellent feedback that the MS degree is meeting its program goals. The postgraduate employer/advisory survey will help determine the success of graduates in securing positions in academia, private sector, governmental agencies, and non-profits.

Full Comprehensive Program Assessment Matrix:

Please refer to Appendix 1A – Program Assessment Matrix.
**Curriculum Map Matrix:**

<table>
<thead>
<tr>
<th>SLO 1: Serve the needs of one or more research clients or collaborators by identifying, implementing, and mathematically defending the use of appropriate statistical methodology</th>
<th>STAT 425/6/7 Statistical Theory Sequence</th>
<th>STAT 550 Generalized Linear Models</th>
<th>STAT 551 Statistical Learning with R</th>
<th>STAT 565 Graduate Consulting Practicum</th>
<th>STAT 590 Graduate Seminar</th>
<th>STAT 599 Thesis</th>
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<tr>
<td>I/D</td>
<td>D</td>
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<tr>
<th>SLO 2: Practice self-learning skills to maintain currency in statistical and associated computing methodology through reading, discussion, and peer presentations of current practices as reflected in statistical literature</th>
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<td>D/M</td>
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<tr>
<th>SLO 3: Build and evaluate inferential and predictive models to analyze data with both numeric and categorical responses using statistical programming</th>
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<td>I/D</td>
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<tr>
<th>SLO 4: Complete a written thesis and oral thesis defense</th>
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<td>D</td>
<td>D</td>
<td>M</td>
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</tr>
</tbody>
</table>

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

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 to 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 to MS Program.)

f. 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 new course would be at the graduate- or undergraduate-level.

STAT 500 – Independent Study (1-4) – New Course*

Individual research or advanced study planned and completed under the direction of a departmental faculty member. Total degree credit limited to 4 units. Total credit limited to 12 units.
Prerequisite: Consent of graduate advisor.

STAT 541 - Advanced Statistical Computing with R (4) – New Course*

Advanced techniques for efficient use of R software to perform statistical computations, analyze large amounts of data, and develop new software. Includes version control systems; code design, documentation, and unit testing; modern data and database software; dynamic data visualizations; special data types; efficient processing of big data; functional programming and recursion; numerical integration and optimization; and. Use of R throughout the course. 4 lectures.
Prerequisites: C- or better in STAT 331 or 531, STAT 334, and STAT 426.

STAT 543 - Advanced Design and Analysis of Experiments (4) – New Course*

2^k and 3^k factorial and fractional factorial designs, balanced and partially balanced incomplete block designs, nested designs, split-plot designs, response surfaces, repeated measures, and other design approaches. Design matrices. Random and mixed effects models, confounding, different parameterizations.
Prerequisites: C- or better in STAT 323 or 523 and STAT 334 or 534.

STAT 545 - Applied Stochastic Processes (4) – New Course*

Properties, simulation, and application of stochastic processes. Discrete-time and continuous-time Markov chains, Poisson processes, Gaussian processes,
continuous-state Markov processes. Markov chain Monte Carlo (MCMC) simulation methods and applications. Fitting stochastic process models to data.
Prerequisites: MATH 206 or MATH 244; and C- or better in STAT 426.

STAT 550 - Generalized Linear Models (4) – New Course

Theory and application of linear and generalized linear models, including modeling correlated responses, overdispersion, random effects models, mixed effects models, Bayesian generalized linear models, generalized additive models, model selection and model checking. Use of statistical software for implementation of methods.
Prerequisites: C- or better in STAT 334 and STAT 427.

STAT 551 - Statistical Learning with R (4) – New Course*

Prerequisites: C- or better in STAT 334, STAT 331 or 531, and STAT 305 or STAT 350.

STAT 566 - Graduate Consulting Practicum (2) – New Course

Practice in statistical consulting. Observing faculty-led consulting sessions. Organizing and leading consulting projects with faculty supervision. Discussion of statistical consulting cases in a seminar format. 2 seminar.
Prerequisite: STAT 466 and graduate standing.

STAT 590 - Graduate Seminar (1) – New Course

Seminar built around topics in advanced statistics selected by the faculty. Discussion of current research papers in statistics. Course may be repeated for up to 3 units.
Prerequisite: Graduate standing and consent of instructor.

STAT 599 – Thesis (4) – New Course

Selection by individual or group, with faculty guidance and approval, of topic for independent research or investigation resulting in a thesis or project to be used to satisfy the degree requirement. An appropriate experimental or analytical thesis or project may be accepted. Total credit limited to 8 units.
Prerequisite: Graduate standing and consent of instructor.

* These courses replace existing 400-level courses.

g. Attach a proposed course-offering plan for the first three years of program implementation, indicating likely faculty teaching assignments.
Fall 2023:
- STAT 425 Probability Theory (4) (Carlton)
- STAT 541 Advanced Statistical Computing with R (4) (Bodwin)

Winter 2024:
- STAT 426 Estimation and Sampling Theory (4) (Sun)
- STAT 545 Applied Stochastic Processes (4) (Ross)
- STAT 551 Statistical Learning with R (4) (Bodwin)

Spring 2024:
- STAT 427 Mathematical Statistics (4) (Sun)
- STAT 466 Statistical Consulting (4) (Schaffner)
- STAT 543 Advanced Design and Analysis of Experiments (4) (McGaughey)
- STAT 550 Generalized Linear Models (4) (Walker)

Fall 2024:
- STAT 425 Probability Theory (4) (Carlton)
- STAT 541 Advanced Statistical Computing with R (4) (Bodwin)
- STAT 566 Graduate Consulting Practicum (2) (various faculty)
- STAT 590 Graduate Seminar (1) (Sun)

Winter 2025:
- STAT 426 Estimation and Sampling Theory (4) (Sun)
- STAT 545 Applied Stochastic Processes (4) (Ross)
- STAT 551 Statistical Learning with R (4) (Glanz)
- STAT 590 Graduate Seminar (1) (Carlton)
- STAT 599 Thesis (4) (various faculty)

Spring 2025:
- STAT 427 Mathematical Statics (4) (Sun)
- STAT 466 Statistical Consulting (4) (Smith)
- STAT 550 Generalized Linear Models (4) (Walker)
- STAT 590 Graduate Seminar (1) (Bodwin)
- STAT 599 Thesis (4) (various faculty)

Fall 2025:
- STAT 425 Probability Theory (4) (Carlton)
- STAT 541 Advanced Statistical Computing with R (4) (Bodwin)
- STAT 566 Graduate Consulting Practicum (2) (various faculty)
- STAT 590 Graduate Seminar (1) (Sun)

Winter 2026:
- STAT 426 Estimation and Sampling Theory (4) (Sun)
- STAT 545 Applied Stochastic Processes (4) (Ross)
- STAT 551 Statistical Learning with R (4) (Bodwin)
- STAT 590 Graduate Seminar (1) (Carlton)
- STAT 599 Thesis (4)
Spring 2026:
STAT 427 Mathematical Statistics (4) (Sun)
STAT 466 Statistical Consulting (4) (Schaffner)
STAT 550 Generalized Linear Models (4) (Walker)
STAT 590 Graduate Seminar (1) (Bodwin)
STAT 599 Thesis (4)

Note: This schedule to be revised in accordance with the University’s timeline for conversion to a semester system.

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.

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

[Administrative reviews pending.]

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

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

(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. (This accounts for 60% of total required units)

(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 a thesis or project.

(3) Satisfactory completion of a thesis, project, or comprehensive examination.

The MS degree requires completion of a thesis (8 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.

(WASC 2013 CFR: 2.2b)

The Cal Poly bachelor’s program in Statistics is the primary bachelor’s program corresponding to the proposed MS in Statistics. This program is not subject to accreditation.

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

(WASC 2013 CFR: 2.2b)

Minimum requirements for applicants to be considered are:

- Filing of an application for Graduate Admission (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 Graduate Admissions Committee 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
- Statement of purpose describing the student’s background and future goals in statistics
- Completion of a bachelor’s degree from an accredited college/university with a minimum grade point average of 3.0 and completion of the following undergraduate coursework:
  - Statistics: At least two courses
  - Mathematics: Multivariable calculus (equivalent to Cal Poly MATH 241) and linear algebra (equivalent to Cal Poly MATH 206)
  - Computer Science: At least course, equivalent to Cal Poly CPE 101

Beyond the minimum requirements, the following considerations are relevant:
- Completion of undergraduate coursework in probability, regression, experimental design, and R. 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.

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

k. For graduate degree programs, specify criteria for student continuation in the program.

14
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 GPA on all courses listed on the formal study plan. 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.”

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

(Not applicable to MS Program.)

m. Provide an advising “roadmap” developed for the major.

(Not directly applicable to MS Program)
See “Supplement 5: Degree Flowchart” for additional degree roadmap details.

n. Describe how accreditation requirements will be met, if applicable, and anticipated date of accreditation request (including the WASC Substantive Change process).

(WASC 2013 CFR: 1.8)

(Not applicable to this MS Program.)

5. Societal and Public Need for the 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.

The following CSU campuses offer an M.S. in Statistics:
   East Bay, San Jose, Fullerton, Long Beach, and San Diego.

In the broader Central Coast region, UC Santa Barbara also offers an M.A. in Statistics.

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

Cal Poly San Luis Obispo is one of only two CSUs to have a standalone Statistics department, with 20 tenure-track faculty members whose training and research is
specifically focused in statistics and data analysis. The CSU campuses currently offering graduate degrees in statistics are all located very far from the Central Coast, so we expect our program to fill a geographical gap. As the flagship CSU, Cal Poly SLO is well suited to offer a rigorous Master’s program, comparable to those at large research institutions.

Locally, the only comparable program is the M.A. in Statistics at UC Santa Barbara. This program is comparable in focus; however, it is housed at a large research university, alongside a Ph.D. program in Statistics, and thus will be culturally distinct from the proposed degree at Cal Poly SLO. Additionally, employment data suggests that the demand for advanced statistics degrees far outstrips the current supply of degree programs. We view the proximity of UC Santa Barbara as an opportunity for cross-institutional research and collaboration.

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

The only loosely comparable graduate program on the San Luis Obispo campus is the M.S. in Business Analytics offered by the Orfalea College of Business. Although this program offers some coursework in statistical analysis and visualization, its primary focus is data-based decision making in business and marketing. The proposed M.S. in Statistics would provide direct training in statistical skills and thought, for application in a variety of fields.

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

No community participation is needed for the planning process. However, the creation of the M.S. in Statistics is partially informed by a survey of 104 alumnae of the B.S. in Statistics at Cal Poly, which included questions to potential employers regarding the marketability of a Statistics M.S. degree. (See below)

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

Statistics is one of the fastest-growing areas of job demand in the United States. A recent market analysis study performed for the College of Science and Mathematics (CSM) by Hanover Research found 6,365 statistics-related job postings in California in the past 6 months alone. Of these, approximately 1,000 were direct statistician/biostatistician positions, which typically require graduate degrees. The market research study also found a projected growth rate for statistics-related jobs in California from 2016 to 2026 is of 19%. This trend, and the trend holds regionally in the West (18.7%) and nationally (18.1%) as well. The Hanover study further indicates that statisticians in government, business, and industry earn between $17,000 and $50,000 more per year if they hold a Master’s degree.

These findings are supported by other national studies: Glassdoor has ranked “data scientist” the #1 job in America several years in a row, with a median salary of $110,000, and it is estimated that the demand for data science skills will increase by over 90% in the next 2 years. The Bureau of Labor Statistics also reports an increasing demand for Master’s level statistics skills, and the annual survey of the American Statistical Association notes a marked salary increase for statisticians with a Master’s degree.
Locally, there is also strong evidence for the market value of a graduate degree. In a recent survey of alumni of the Cal Poly Statistics Department (to which 104 people responded), 82% of those employed in industry stated that their workplace would be “somewhat more” or “much more” likely to hire an applicant with a Master’s degree. Most respondents cited the need for specialized data skills as the reason for this preference. Respondents also frequently cited training in specific skills and experience producing independent research as attractive features to prospective employers.

The Statistics Department at Cal Poly has a reputation for producing graduates who are prepared to succeed in the workforce immediately upon graduation. However, as analyses of data-based questions become more complex, the skills required for the most desirable jobs become more specialized. By offering an M.S. program in Statistics, Cal Poly would vastly improve the employment opportunities and job quality of its graduates.

6. 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.

The recent market analysis study performed by Hanover Research concluded that we should move forward with a master’s program in Statistics partly because of the strong student demand for such a program across all geographic levels. Hanover Research cites an average annualized growth rate for master’s degrees in Statistics in California nearly three times the growth rate for all master’s degrees in California. Explicitly, master’s degrees conferrals in Statistics grew at an annualized rate of 9.6 percent 2013 to 2017, much faster than the rate for master’s degrees across all fields (3.3 percent). Trends at the regional and national levels are even stronger, with 9.8 percent and 14.7 percent growth, respectively. Similarly, bachelor’s degrees in statistics programs are also experiencing rapid growth, indicating a strong outlook for Cal Poly’s current undergraduate program, as well as growing prospective student market for the proposed master’s program in Statistics. The integrated postsecondary education data system (IPEDS) indicates 18 master’s level and 16 bachelor’s level Statistics programs in California in 2017. Regionally, there are 24 master’s level and 19 bachelor’s level program in the Far West. In considering the very strong growth at both degree levels, Cal Poly is well positioned to launch a new master’s degree in Statistics.

To ascertain student demand for and interest in a master’s program in Statistics, in fall 2018 we surveyed our current students as well as alumni. Out of the 104 alumni who responded, 47.6% indicated that they pursued advanced degrees elsewhere after graduating from Cal Poly, and 79.6% said they would have been “somewhat” or “very” likely to enroll in an M.S. in statistics at Cal Poly if one had been offered. Similarly, out of the 62 current Cal Poly statistics majors who responded, 73.1% (46 students) indicated that they would be
likely to pursue such a program. Both alumni and current students frequently cited the need for further training in specific skills and experience producing independent research as reasons for their interest. Several current students also emphasized the increased job availability as a factor in their decision. The surveyed alums and current students also provided positive written comments on the prospects, utility and career impact of the proposed program (see appendix 3 for their complete and verbatim comments).

Furthermore, the Statistics Department collects data on graduating seniors every year for program assessment. Over the years, we have gathered encouraging information on student demand and interest for a master’s program. For instance, out of the 29 graduating seniors surveyed in 2017, 86.2% indicated that they would “likely” or “definitely” consider a master’s program in applied Statistics as an academic option. Similarly, out of the 31 graduating seniors surveyed in 2018, 83.9% indicated that they would “likely” or “definitely” consider a master’s program in applied Statistics as an academic option. A high percentage of the 2017 (62.1%) and 2018 (64.5%) graduating seniors surveyed indicated that they would “definitely” consider such a program.

In this light, the department will recruit prospective master’s students from three sources:
1) existing undergraduate Statistics majors,
2) existing Statistics and Data Science minors, and
3) external students through the general Cal Poly graduate admissions process.
Based on our current and forecasted tenured/tenure-track faculty density, we anticipate our graduate program can sustain approximately 20 graduate students per cohort. We estimate that at least 15 of our existing undergraduate majors and minors will be recruited for the master’s program along with at least 5 external candidates.

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. A growing M.S. program with funded research projects will provide an opportunity to recruit individuals from diverse ethnic backgrounds and lower socioeconomic status. Because the proposed program involves on-campus delivery of courses, issues of access for non-traditional students cannot be solved via a distance M.S. program approach. However, we will accommodate when possible non-traditional students such as those in the workforce who may take a longer path to completion of the M.S. degree. In particular, students may enter the program via existing partnerships of the Statistics Departments with local or Bay Area companies such as Google, MindBody JupyterLabs, etc. In these cases, we will be flexible with curriculum design and work closely with students’ supervisors to create a plan of study that is feasible within the constraints of workforce demands.
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.

<table>
<thead>
<tr>
<th>Undergraduate enrollment (Fall Census)</th>
<th>Total degrees awarded</th>
</tr>
</thead>
<tbody>
<tr>
<td>Statistics majors</td>
<td></td>
</tr>
<tr>
<td>176</td>
<td>192</td>
</tr>
</tbody>
</table>

d. Describe professional uses of the proposed degree program.

In 2015, the Bureau of Labor Statistics named “Statistician” as one of the fastest-growing jobs in the United States. There are countless opportunities for holders of Master’s degree in statistics. Our graduates will be equipped with a singular set of analytical skills that will make them valuable in industry, government, academia and almost every area of science. Below are some of the main career paths for prospective graduates from our program:

- Statistician (research analyst for a corporation or a federal/state/local agency, such as the U.S. Census Bureau)
- Data Scientist (for tech companies, such as Google, and other corporations)
- Biostatistician (research analyst for a corporation, such as Amgen, or a federal/state/local agency, such as the CDC or a county public health department)
- Sports statistician
- University lecturer
- MS as preparation for PhD in Statistics, Biostatistics, or Data Science

According to the Hanover Research market analysis, California employers advertised 5,365 statistics-related jobs between July 2018 and December 2018.

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.

We anticipate the following student enrollments with an average degree completion time of 2 years.

<table>
<thead>
<tr>
<th>Number of Majors (Annual)</th>
<th>At Initiation</th>
<th>After 3 Years</th>
<th>After 5 Years</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>15</td>
<td>20</td>
<td>20</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number of Graduates (Cumulative)</th>
<th>At Initiation</th>
<th>After 3 Years</th>
<th>After 5 Years</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>40</td>
<td>80</td>
</tr>
</tbody>
</table>
7. Existing Support Resources for the Proposed Degree Major Program

a. 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)

<table>
<thead>
<tr>
<th>Name</th>
<th>Rank/Title</th>
<th>Degree</th>
<th>Research</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr. Andrew Schaffner</td>
<td>Professor, Chair</td>
<td>Ph.D. Statistics</td>
<td>Public Health, Ecology (sampling, monitoring, models), Agriculture, Consulting</td>
</tr>
<tr>
<td></td>
<td></td>
<td>University of Washington, Seattle 1997</td>
<td></td>
</tr>
<tr>
<td>Dr. Allan Rossman</td>
<td>Professor</td>
<td>Ph.D. Statistics</td>
<td>Statistics education, Curriculum development, Interviews with statistics educators</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Carnegie Mellon University 1989</td>
<td></td>
</tr>
<tr>
<td>Dr. Kelly Bodwin</td>
<td>Assistant Professor</td>
<td>Ph.D. Statistics</td>
<td>Data mining, Machine learning, Big data, Statistical computing, Applications in text analysis, social science, and biology</td>
</tr>
<tr>
<td></td>
<td></td>
<td>University of North Carolina, Chapel Hill 2017</td>
<td></td>
</tr>
<tr>
<td>Dr. Matt Carlton</td>
<td>Professor</td>
<td>Ph.D. Mathematics</td>
<td>Applied probability, Statistics education, Predictive modeling for higher-education outcomes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>University of California, Los Angeles 1999</td>
<td></td>
</tr>
<tr>
<td>Dr. Beth Chance</td>
<td>Professor</td>
<td>Ph.D. Operations Research</td>
<td>Curriculum development and assessment in statistics education, Statistics education research</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cornell University 1994</td>
<td></td>
</tr>
<tr>
<td>Dr. Jimmy Doi</td>
<td>Professor</td>
<td>Ph.D. Statistics</td>
<td>Categorical Data Analysis</td>
</tr>
<tr>
<td>Name</td>
<td>Title</td>
<td>Institution</td>
<td>Specializations</td>
</tr>
<tr>
<td>----------------------</td>
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<td>--------------------------------------------------</td>
<td>------------------------------------------------------</td>
</tr>
<tr>
<td>Dr. Samuel Frame</td>
<td>Professor</td>
<td>North Carolina State University 2003</td>
<td>Biostatistics, Statistical Computing, Statistics Education</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ph.D. Statistics and Applied Probability</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>University of California, Santa Barbara 2007</td>
<td></td>
</tr>
<tr>
<td>Dr. Hunter Glanz</td>
<td>Associate</td>
<td>Boston University 2014</td>
<td>Statistical Computing Education, Data Science Education, Remote Sensing, Machine Learning</td>
</tr>
<tr>
<td></td>
<td>Professor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dr. Giri Gopalan</td>
<td>Assistant</td>
<td>University of Iceland 2017</td>
<td>Hierarchical and Bayesian statistical modeling, Spatio-temporal statistics, Applications to the natural sciences and engineering (e.g., glaciology)</td>
</tr>
<tr>
<td></td>
<td>Professor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dr. Bret Holladay</td>
<td>Assistant</td>
<td>University of California, Santa Barbara 2016</td>
<td>Theory of Estimation, Confidence Intervals, Statistics Education</td>
</tr>
<tr>
<td></td>
<td>Professor</td>
<td></td>
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</tr>
<tr>
<td>Dr. Ulric Lund</td>
<td>Professor</td>
<td>University of California, Santa Barbara 1998</td>
<td>Circular Statistics, Motor Vehicle and Bicycle Accident, Data Analysis, Statistical Computing, Statistical Consulting</td>
</tr>
<tr>
<td>Dr. Karen McGaughey</td>
<td>Professor</td>
<td>Kansas State University 2003</td>
<td>Design of experiments, Statistics education, Statistical consulting, Applications of statistics to engineering</td>
</tr>
<tr>
<td>Dr. Zoe Rehnberg*</td>
<td>Assistant</td>
<td>University of</td>
<td>Biostatistics and genetics</td>
</tr>
<tr>
<td></td>
<td>Professor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Name</td>
<td>Title</td>
<td>Institution</td>
<td>Degree</td>
</tr>
<tr>
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</tr>
<tr>
<td>Dr. Steve Rein</td>
<td>Associate Professor</td>
<td>Michigan</td>
<td>Ph.D. Statistics</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>UC Berkeley</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1993</td>
</tr>
<tr>
<td>Dr. Emily Robinson*</td>
<td>Assistant Professor</td>
<td>University of Nebraska at Lincoln</td>
<td>Ph.D. Statistics</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>University of Nebraska at Lincoln</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2022 (expected)</td>
</tr>
<tr>
<td>Dr. Kevin Ross</td>
<td>Associate Professor</td>
<td>University of North Carolina at Chapel Hill</td>
<td>Ph.D. Statistics</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>University of North Carolina at Chapel Hill</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>2006</td>
</tr>
<tr>
<td>Dr. Soma Roy</td>
<td>Professor</td>
<td>The Ohio State University</td>
<td>Ph.D. Statistics</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>The Ohio State University</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2008</td>
</tr>
<tr>
<td>Dr. Anelise Sabbag</td>
<td>Assistant Professor</td>
<td>University of Minnesota</td>
<td>Ph.D. Quantitative Methods in Education (Statistics Education Core)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>University of Minnesota</td>
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<tr>
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<td></td>
<td>2016</td>
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</tr>
<tr>
<td>Dr. Jeff Sklar</td>
<td>Professor</td>
<td>UC Santa Barbara</td>
<td>Ph.D. Statistics</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>UC Santa Barbara</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2003</td>
</tr>
<tr>
<td>Heather Smith</td>
<td>Lecturer</td>
<td>Florida State University</td>
<td>M.S. Statistics</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Florida State University</td>
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<td></td>
<td></td>
<td></td>
<td>1989</td>
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</tr>
<tr>
<td>Name</td>
<td>Title</td>
<td>Education</td>
<td>Research Interests</td>
</tr>
<tr>
<td>---------------------</td>
<td>------------------------</td>
<td>------------------------------------------------</td>
<td>---------------------------------------------------------</td>
</tr>
<tr>
<td>Dr. Dennis Sun**</td>
<td>Associate Professor</td>
<td>Ph.D. Statistics Stanford University 2015</td>
<td>Data science, Statistical software, Statistics education, Audio signal processing</td>
</tr>
<tr>
<td>Dr. Allison Theobold</td>
<td>Assistant Professor</td>
<td>Ph.D. Statistics Education Montana State University 2017</td>
<td>Data science, Statistical software, Statistics education</td>
</tr>
<tr>
<td>Dr. John Walker</td>
<td>Professor</td>
<td>Ph.D. Statistics Cornell University 1995</td>
<td>Statistical computing, Statistical consulting, Statistics education, Linear models</td>
</tr>
</tbody>
</table>

* New hire; expected start date Fall 2022
** Also affiliated with Cal Poly Department of Computer Science and Google.

b. 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 Science and Mathematics. All classrooms at Cal Poly are internet (Wi-Fi and Ethernet) ready and utilize Smart Room technology, including electronic projectors or monitors.

The Statistics Department has one studio computer lab, with a capacity of 35 students at individual computer workstations.

See: Supplement 8: Strategic Enrollment Management Letter of Support

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

Kennedy Library computer resources:
(http://lib.calpoly.edu/use-tech-and-print/borrow-laptops-ipads-and-more/)

See: Supplement 9: Kennedy Library Letter of Support

d. Describe available academic technology, equipment, and other specialized materials.

Faculty and Students have access to the following:
8. Additional Support Resources Required

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

Our support needs were initially determined under the assumption of 21 full-time tenured or tenure-track faculty during the academic year prior to the implementation of the MS program. At inception, we anticipated a need for one additional tenured or tenure-track faculty member (bringing the total to 22) for administrative duties, supervision of graduate research, and instruction of newly proposed graduate courses in the curriculum of the program. We also anticipated a need for an additional tenured or tenure-track faculty member in the first three to five years, to allow for growth in the M.S. program as well as the Data Science program.

As of Winter 2022, the Statistics Department consists of 21 full-time tenured or tenure-track faculty members and two newly hired tenure-track faculty members with an anticipated start date of Fall 2022. (See Supplement 6: New Position Approval.)

We do not foresee a need for any additional lecturer or staff positions in relation to the MS program in the short term.

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).

Because the MS coursework consists primarily of elevations of existing classes, we do not anticipate a need for additional space immediately at inception.

However, the addition of the MS program - in combination with anticipated growth in the undergraduate degree program and ever-increasing enrollment in statistics service courses
— increases demand for Studio Classroom space. We anticipate a need for an additional Studio classroom within the first 3-5 years of the MS program.

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.

No additional library resources are required to implement the program, nor is any such need anticipated during the first few years of the program.

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, nor is any such need anticipated during the first few years of the program.

9. Self-Support Programs

N/A
<table>
<thead>
<tr>
<th>ILOs</th>
<th>PLOs</th>
<th>SLOs</th>
<th>Course where SLO is assessed</th>
<th>Assessment activity used to measure each SLO</th>
<th>Assessment tool used to measure outcome success</th>
<th>Assessment schedule – how often SLOs will be assessed</th>
<th>How assessment data will be reported as evidence SLO performance criteria have been met</th>
<th>Designated personnel to collect, analyze, and interpret student learning outcome data for the program</th>
<th>Student learning outcome data dissemination schedule</th>
<th>Closing the loop strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td>ILO 1: Think critically and creatively</td>
<td>PLO 5: Communicate effectively (written and oral) and organize/manage projects in collaborative settings (within and between disciplines)</td>
<td>SLO 2: Practice self-learning skills to maintain currency in statistical and associated computing methodology through reading, discussion, and peer presentations of current practices as reflected in statistical literature</td>
<td>STAT 599</td>
<td>Research Proposal</td>
<td>Rubric designed for each SLO.</td>
<td>Once every two years starting in year two.</td>
<td>Report on minimum percentage of students that meet or exceed standards for each SLO.</td>
<td>The thesis committee will assign and grade assessment using rubric developed for this assignment.</td>
<td>Department’s assessment coordinator will analyze rubric data.</td>
<td>The assessment committee will review the data and identify where improvement is needed.</td>
</tr>
<tr>
<td>ILO 3: Demonstrate expertise in a scholarly discipline and understand that discipline in relation to the larger world of the arts, sciences, and technology</td>
<td>PLO 9: Conduct independent learning and research</td>
<td>SLO 1: Serve the needs of one or more research clients or collaborators by identifying, implementing, and mathematically defending the use of appropriate statistical methodology</td>
<td>STAT 599</td>
<td>Written Thesis</td>
<td>Rubric designed for each SLO.</td>
<td>Once every two years starting in year two.</td>
<td>Report on minimum percentage of students that meet or exceed standards for each SLO.</td>
<td>The thesis committee will assign and grade assessment using rubric developed for this assignment.</td>
<td>Department’s assessment coordinator will analyze rubric data.</td>
<td>The assessment committee will review the data and identify where improvement is needed.</td>
</tr>
<tr>
<td>ILO 4: Work productively as individuals and in groups</td>
<td>PLO 1: Demonstrate mastery of core statistical theory</td>
<td>SLO 3: Build and evaluate inferential and predictive models to analyze data with both numeric and categorical responses using statistical programming</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>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.</td>
<td></td>
<td></td>
<td>The assessment committee will review the data and identify where improvement is needed.</td>
</tr>
<tr>
<td></td>
<td>PLO 2: Demonstrate proficiency in statistical methodology and data analysis</td>
<td>SLO 4: Complete a written thesis and oral thesis defense</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>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.</td>
<td></td>
<td></td>
<td>The assessment committee will review the data and identify where improvement is needed.</td>
</tr>
<tr>
<td>ILO 1: Think critically and creatively</td>
<td>PLO 1: Demonstrate mastery of core statistical theory</td>
<td>STAT 599</td>
<td>Oral Defense</td>
<td>Rubric designed for each SLO.</td>
<td>Once every two years starting in year two.</td>
<td>Report on minimum percentage of students that meet or exceed standards for each SLO.</td>
<td>The thesis committee and faculty members in attendance will grade assessment using rubric developed for this assignment.</td>
<td>Assessment data will be reported 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.</td>
<td>The assessment committee will review the data and identify where improvement is needed.</td>
<td></td>
</tr>
<tr>
<td>ILO 2: Communicate effectively</td>
<td>PLO 2: Demonstrate proficiency in statistical methodology and data analysis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>ILO 3: Demonstrate expertise in a scholarly discipline and understand that discipline in relation to the larger world of the arts, sciences, and technology</td>
<td>PLO 3: Select, justify, and apply appropriate inferential and predictive methods</td>
<td></td>
<td></td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>ILO 4: Work productively as individuals and in groups</td>
<td>PLO 4: Responsibly interpret results and output of statistical analyses</td>
<td></td>
<td></td>
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<td></td>
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<td></td>
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</tr>
<tr>
<td>ILO 6: Make reasoned decisions based on an understanding of ethics, a respect for diversity, and an awareness of issues related to sustainability</td>
<td>PLO 5: Communicate effectively (written and oral) and organize/manage projects in collaborative settings (within and between disciplines)</td>
<td></td>
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</tr>
<tr>
<td>ILO 7: Engage in lifelong learning</td>
<td>PLO 7: Collaborate with researchers and clients to solve data oriented problems that arise in other disciplines</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>PLO 8: Collaborate with researchers and clients to solve data oriented problems that arise in other disciplines</td>
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</tr>
<tr>
<td></td>
<td>PLO 9: Conduct independent learning and research</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>ILO 7: Engage in lifelong learning</td>
<td>PLO 1: Demonstrate mastery of core statistical theory</td>
<td>SLO 1: Serve the needs of one or more research clients or collaborators by identifying, implementing, and mathematically defending the use of appropriate statistical methodology</td>
<td>Postgraduate employer/advisory survey</td>
<td>Survey</td>
<td>Once every two years starting in year two.</td>
<td>Report on minimum percentage of students that meet or exceed standards for each SLO.</td>
<td>The graduate program coordinator will assign, administer and analyze data from survey.</td>
<td>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.</td>
<td>The assessment committee will review the data and identify where improvement is needed.</td>
<td></td>
</tr>
</tbody>
</table>
The Statistics Department Curriculum Committee strongly supports the MS in Statistics. The program, as well as each course, has been reviewed and approved by the committee. The degree program offers a comprehensive curriculum with an emphasis in real world applications, including computing and consulting. Students graduating with an M.S. in Statistics from Cal Poly State University, San Luis Obispo will be prepared to contribute immediately upon entering the workforce.

This M.S. in Statistics aligns with the mission of the Statistics Department, complementing our strong B.S. in Statistics. It provides an opportunity for both faculty and undergraduates to engage with a challenging graduate curriculum that will enhance the department, creating more opportunities for collaboration and contribution to the university and beyond. We see the implementation of this degree program as a positive contribution to our department, Cal Poly and the CSU and strongly support the implementation of this degree program.
Approval by College of Science and Math Curriculum Committee

From: Elena Keeling <ekeeling@calpoly.edu>
Sent: Thursday, January 27, 2022 7:29 PM
To: Andrew A. Schaffner <aschaffn@calpoly.edu>; Gregory Shannon Bohr <gbohr@calpoly.edu>
Cc: Kelly N. Bodwin <kbodwin@calpoly.edu>; John H. Walker <jwalker@calpoly.edu>
Subject: Re: CCC and ASCC confirmation of review for MS Statistics

Hello Andrew,

You still have approval from the CSM Curriculum Committee.

Elena Keeling
Biological Sciences Department
Cal Poly, San Luis Obispo
ekeeling@calpoly.edu

Approval by Academic Senate Curriculum Committee

From: Gregory Shannon Bohr <gbohr@calpoly.edu>
Sent: Thursday, January 27, 2022 8:15 PM
To: Andrew A. Schaffner <aschaffn@calpoly.edu>; Elena Keeling <ekeeling@calpoly.edu>
Cc: Kelly N. Bodwin <kbodwin@calpoly.edu>; John H. Walker <jwalker@calpoly.edu>
Subject: RE: CCC and ASCC confirmation of review for MS Statistics

Hi Andrew –

The Academic Senate Curriculum Committee discussed this at our meeting today, and we confirm our support for the MS Statistics proposal.

Would you like a memo to that effect, or is this email sufficient?

Best,
Greg

Dr. Gregory S. Bohr
Associate Professor of Geography, Social Sciences Department
Chair, Academic Senate Curriculum Committee
Cal Poly, San Luis Obispo
(805) 756-1322, Building 47 - 12C
M.S. Statistics - Approved 400-Level Electives

<table>
<thead>
<tr>
<th>Course</th>
<th>Name</th>
<th>Units</th>
<th>Prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>DATA 402</td>
<td>Mathematical Foundations of Data Science</td>
<td>3</td>
<td>CSC 466, STAT 334, DATA 301; Concurrent DATA 401, DATA 403</td>
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<tr>
<td>DATA 403</td>
<td>Data Science Process Laboratory</td>
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<td>Concurrent DATA 401, DATA 402</td>
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<td>CSC 448</td>
<td>Bioinformatics Algorithms</td>
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<td>CSC 349</td>
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<td>CSC 466</td>
<td>Knowledge Discovery from Data</td>
<td>4</td>
<td>CSC 349</td>
</tr>
<tr>
<td>CSC 477</td>
<td>Sci and Info Visualization</td>
<td>4</td>
<td>CSC 349</td>
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<td>MATH 406</td>
<td>Linear Algebra III</td>
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<td>MATH 306</td>
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<td>MATH 412</td>
<td>Introduction to Analysis I</td>
<td>4</td>
<td>MATH 306</td>
</tr>
<tr>
<td>MATH 413</td>
<td>Introduction to Analysis II</td>
<td>4</td>
<td>MATH 412</td>
</tr>
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<td>MATH 414</td>
<td>Introduction to Analysis III</td>
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<td>MATH 413</td>
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<td>MATH 451</td>
<td>Numerical Analysis I</td>
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<td>MATH 242</td>
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<td>MATH 453</td>
<td>Numerical Optimization</td>
<td>4</td>
<td>MATH 306 and MATH 451</td>
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<td>STAT 410</td>
<td>Statistics Education</td>
<td>4</td>
<td>STAT BS</td>
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<tr>
<td>STAT 415</td>
<td>Bayesian Reasoning and Methods</td>
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<td>STAT BS</td>
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<td>STAT 416</td>
<td>Stat Analysis of Time Series</td>
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<td>STAT BS</td>
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<td>STAT 417</td>
<td>Survival Analysis Methods</td>
<td>4</td>
<td>STAT BS</td>
</tr>
<tr>
<td>STAT 419</td>
<td>Applied Multivariate Statistics</td>
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<td>STAT BS</td>
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<tr>
<td>STAT 421</td>
<td>Survey Sampling and Method</td>
<td>4</td>
<td>STAT BS</td>
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<td>STAT 440</td>
<td>SAS Certification Prep</td>
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<td>STAT BS</td>
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<tr>
<td>STAT 441</td>
<td>SAS Adv Certification Prep</td>
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<td>STAT 440</td>
</tr>
</tbody>
</table>

Notes:

As a prerequisite "STAT BS" indicates the prerequisite courses are required as part of the BS in Statistics.

STAT 414 and 418 are deliberately omitted from this list; students considering an M.S. should enroll in STAT 550 in lieu of these courses.
### Survey of current students

<table>
<thead>
<tr>
<th>What would be the main factors in your decision to apply or not?</th>
</tr>
</thead>
<tbody>
<tr>
<td>How mathematically rigorous it is</td>
</tr>
<tr>
<td>Completion Time, Faculty</td>
</tr>
<tr>
<td>If the program exists</td>
</tr>
<tr>
<td>quality of teaching, local work opportunities</td>
</tr>
<tr>
<td>Whether I got competitive job offers after graduation</td>
</tr>
<tr>
<td>Availability</td>
</tr>
<tr>
<td>I would definitely apply because I intend on pursuing my masters.</td>
</tr>
<tr>
<td>I would 100% apply. No questions asked.</td>
</tr>
<tr>
<td>I want to go somewhere else. Try different things. Meet new people. People keeps talking about 4+1 and get out early to get a job. I just want to challenge myself and enjoy life.</td>
</tr>
<tr>
<td>How developed the program is and what is has to offer for a future career</td>
</tr>
<tr>
<td>GPA</td>
</tr>
<tr>
<td>Length of masters (preferably &lt;= 12 months), scope of material (more applied than theoretical)</td>
</tr>
<tr>
<td>I was planning on getting my masters in statistics after graduating so it would be great if it was offered here!</td>
</tr>
<tr>
<td>cost and whether I need a masters</td>
</tr>
<tr>
<td>Funding</td>
</tr>
<tr>
<td>Course offerings / cost / field of study</td>
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<tr>
<td>if it is 4+1 program</td>
</tr>
<tr>
<td>If it's available by the time I graduate</td>
</tr>
<tr>
<td>how expensive it is, and if it would increase my chances at getting a good job</td>
</tr>
<tr>
<td>I'm not looking to go get a master's degree since I'm focused on passing actuarial exams and working after graduation. If I were not pursuing an actuarial career, I would be getting a graduate degree. I would apply to Cal Poly if I were planning to get a Master's in Statistics.</td>
</tr>
<tr>
<td>It would be great to stay at Cal Poly and work with the same professors in a familiar environment</td>
</tr>
<tr>
<td>I don’t know much about other statistics masters programs, so I would want to do research on other programs and apply to others also</td>
</tr>
<tr>
<td>Depending on the number of actuary tests I have passed</td>
</tr>
<tr>
<td>The main factor fir me would be how long it would take, as well as the cost.</td>
</tr>
<tr>
<td>If I actually decide that I want to pursue grad school</td>
</tr>
<tr>
<td>The career I have in mind at the moment doesn’t require a master’s degree.</td>
</tr>
<tr>
<td>I am not completely sure what I want to do yet.</td>
</tr>
<tr>
<td>If I want to further my education</td>
</tr>
<tr>
<td>Details of the Program</td>
</tr>
<tr>
<td>I would be more likely to apply if it was a 4+1 program.</td>
</tr>
<tr>
<td>Coursework</td>
</tr>
<tr>
<td>Actuarial path won't need masters</td>
</tr>
<tr>
<td>If I could get a job right out of undergrad or not</td>
</tr>
<tr>
<td>I’m looking to apply for a PhD program, and probably not in pure statistics, so it's kind of irrelevant for me. However, if I were planning on getting a masters in statistics, things I would consider include: is it a 2 year program or 4+1 with the stats major? What’s the curriculum like? Is it flexible (are there different</td>
</tr>
</tbody>
</table>
tracks or electives)? Also I would take into account the rankings of other programs.

Focus of study available
If I can do 4 + 1
I was born and raised in SLO. My family lives here.
Want to get other degree
Seeing if I want to earn a Master's degree in something other than statistics
It might be too late to apply. However I do plan to work for a little bit first so we will see
How much I am getting out of the program for how much I am paying
Cost, how important a masters degree is for stat in terms of employability, length of program
I haven't looked into other masters programs, but if this one is good and I know other people staying at Cal Poly that I like, I'll be interested.

Survey of Alumni

In your opinion, how would an M.S. in Statistics change an applicant's opportunities at your place of work?

An M.S. in (Bio)statistics with a focus on healthcare is required at a minimum for the majority statisticians at the City of Hope.
The amount of departments that they would be applicable would expand, and their starting level would likely be higher.
Having an M.S. in Statistics would give the applicant a much greater chance of being hired above Entry Level status and allow an applicant to be hired into a more technical position.
You can not apply without a Masters at a minimum.
Depending on the job they are applying for it would greatly increase their chances of getting the position. Many of my colleagues have a graduate degree of some kind.
We only have a few jobs that are specifically for statisticians. But it would greatly increase your possibility of getting such a job.
An M.S. in statistics would likely result in higher pay and more responsibility at my place of work.
Where I was before getting my PhD someone without a masters wasn't considered.
Within my company statistics is not necessarily a sought after field, the fact a potential hire has the "MS" title is an advantage merely because it is a higher level of education and knowledge.
It is a requirement to have a MS in statistics or related field
Would greatly increase an applicants chances or being offered the position. At my place of work however, a M.S. in Statistics would not increase an applicants chances any more than an MBA would.
it would increase opportunities
Work in a slightly different department doing slightly different work on the same project.
All positions on my biostatistics team require an M.S. in biostatistics or statistics to be eligible for hire.
Entry level actuarial work is highly competitive in the SF bay area. It may make the candidate stand out if the applicants have the same # of exams.
It is incredibly helpful to have an MS in statistics. It shows intelligence and a willingness to work. It also shows that an applicant thinks like a masters student.
A minimum of MS is required for the statistician title, although we do offer Research Assistant positions to BS of all type (and obviously BS in Statistics candidates have more opportunity for us than a BS in psych, chem, history, english, etc..)

SUPPLEMENT 3
Reduces the number of years of professional experience needed to reach same position as someone with a BS only
It would open more doors to research level jobs and things like experimental design.
In our company, having a Masters does not increase your chances of hire much, and is not required to work your way up in the company.
More opportunities to start at a higher position/pay. Easier to get interviews directly out of college with a master's degree
I still like to have an MS or greater when hiring a Data Scientist - I need to have an individual comfortable with going deeper into the theory behind the algorithms & have a better-rounded statistical knowledge + a little more seasoning in discussions with our customers ; there are ML engineer roles that require more programming and less theory and for that, a BS is sufficient.
When hiring me they did not seem to put much weight on specific high degrees but rather knowledge and interest
The applicant would have a better opportunity working in the data analytics group of our actuarial practice.
Responsibilities change and a faster path to project forward.
Greatly improve.
It would help you meet the qualifications for data science/statistics related roles.
Applicants with a Masters degree would be more qualifies for the advanced analysis teams rather than the business analysis teams. They would have more opportunity and be able to pick which field they would want to be in.
more analysis-related opportunities, more contributions to reports/manuals/publications
You may be overqualified and salary expectations may not be in line with reality.
We only offer roles as Biostatisticians to Applicants with MS degrees. Anyone with an undergraduates degree is welcome to apply for any of the programming positions.
We don't hire analysts without at least a M.S. in a quantitative discipline. It would greatly increase the applicant's opportunities.
A monumental change. Applicants with only a B.S. are barely considered, an M.S. is pretty much required at this point.
While I've been in academia for the last 5 years, the previous 14 years were in private sector and federal govt. In both cases I think a BS only would be a tough sell for hiring unless the candidate had a lot of practical experience (5+ years of demonstrated high quality work and a healthy toolbox)
i would hope they have stronger knowledge in statistics, and their resume would more easily get through to the recruiters
A master's allows opportunities in more sectors the company is involved in
For a data science position a MS would at least get your foot in the door.
Hard to say.
I lead a program for graduate students in statistics, in which I recruit, hire, and train them for full-time employment as research statisticians. When I'm presenting on campus, I make it clear that the ticket for entry into our advanced analytics groups is a Master's.
Today, machine learning and statistics are considered a specialization requiring focused training, so having a MS reduces the friction in the hiring process where you must explain your level of education and expertise in the subject.
Negligible impact
The depth of knowledge and critical thinking, in general, is higher from those with Master's than those with just a Bachelor's. Also, at least in data science, most job reqs require a PhD with a Master's being entry level.

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**SUPPLEMENT 3**
For data engineering or business reporting, a bachelor's and business domain knowledge can go far. Data science and machine learning relies on the ability to stay up to date with recent advancements, only accessible through graduate level research papers and discussions. A lot more computer science is necessary as well.

Top of the list of applicants
We hire both levels of education. Masters level applicants are typically much stronger and we want more, but we take a lot of BS applicants to fill in teams of analysts. We have drastically expanded the size of our data team in the last year.

An MS would show that the applicant has a high capability to learn and be taught new concepts. My department focuses on a Analytics and Reporting which requires statistical literacy, mainly in the form of providing good and informative data visualizations.

It really depends on the level of the position...

Depends on actual work experience as well. Someone with a BS and more work experience is weighted heavier than someone with an MS but no work experience.

As a high school teacher, I would additionally qualify to teach at a community college.

An elevated starting position, higher starting salary, more autonomy
They would have more opportunities, they would be considered for more technical roles (Data scientist as opposed to just analyst)

All data scientists (other than me) hold at least an M.S., I do not think that applicants with only a Bachelor's degree are considered for data scientist positions at this point.

For the most part, it would not change an applicant's opportunities. Our firm is more interested in progress with actuarial exams than an M.S in Statistics.

I work in a small department within Callaway Golf where only 1 manager is needed. Therefore, at this moment a masters in statistics would not help an applicants considerably.

might be my own personal bias, because i don't think my masters (from UCSB ) did much for me in terms of my ability to do my job incrementally beyond what I got from poly, but for me whether someone has a MS or not wouldn't have much bearing on my likelihood of getting them past the resume status or affect my hiring decision.

Opportunity for a larger starting income
In the Bay Area, your prospects change dramatically when you have a Masters degree. Many positions require it, and even if they don't the pay will likely be much higher. I think that if you are going for a highly technical position in SF it's becoming more of a requirement.

More leverage for higher pay
We look for applicants who have a wide breadth of education and experience, but a Master's degree in Statistics could only be beneficial. As we strive to be a more data-driven organization I could see this being even more impactful in the future.

It probably wouldn't - this might be a rare case but I am one of two Data Scientists in my company, neither of us has Master's degrees, but I could see how they might be helpful. However this is a startup company, they saw me as an asset not only because of my background in Statistics but also my personality, which is a major factor in a small company. I had applied to larger companies in the past and in those cases, the Master's Degree stands out more and seems more of a requirement. So it definitely would open doors for some folks.

More time to learn about theory of stats. Under grad seems like such a small slice of the pie
It would give them a greater chance to be hired. In my company the incentive is that they can immediately be billed out at a higher rate than those without a masters degree. (Therefor they should also get a higher starting salary even with no industry experience.)

Pay grade and types of consultations assigned. Because I have a B.S. in statistics, I'm on a separate
career track than those who have an M.S. (which includes slightly lower pay). Also projects involving large grants, for example, are usually given to statisticians with a graduate degree or more experience. In my work, a masters degree is less about statistical rigor and rather more about the applicants character, work ethic and commitment to the analytical space. In some cases though, a masters could be a deterrent if the applicant lacks job experience which points to the importance of internships or industry experience between an undergrad and master programs.

N/A, I'm not pursuing a career in statistics at the moment. However, I think it would absolutely change opportunities for any statistics-related career.

They would have more opportunities and a higher degree of autonomy on analysis

Yes, it would allow for a wider range of positions

Not too much. Maybe a little increase of odds.

Open up avenues to different departments of the company, to more advanced positions.

I hire for entry level positions that do not require any kind of Masters degree. If my company was specifically looking for a statistician or high level data analyst, an applicant with a MS in Statistics would be much more desirable than one without an MS.

No current place of work to comment on. However, in most jobs I have looked at a Master's degree seems to be the equivalent of 2+ years of work experience (i.e. jobs require 2+ years of experience OR a Master's degree).

It may help achieve a higher position potentially but the company I work for is small so I'm not sure how much of a difference a master's degree would make.

One would likely be able to move up and around departments more.

Hard to say, for actuaries it wouldn't make much of a difference, but for data science/analytics roles it could benefit them

If they did not have actual work experience in analytics at a company, then a person with an M.S. in Stats would be better than a B.S. in Stats, but 2-3 years working in stats/data/analytics will win over an M.S. in Stats and no work experience.

We would be able to allow someone to do work fairly independently of us, not a lot of supervision would be necessary.
Academic Senate Curriculum Committee  
California Polytechnic State University  

Dear Academic Senate Curriculum Committee,

This is a letter to indicate support for the Masters of Science in Statistics program that has been proposed by the Statistics Department in the College of Science and Mathematics at California Polytechnic State University.

This program is seen as a strong extension of our undergraduate Statistics program, as well as a complement to our cross disciplinary studies minor (CDSM) in Data Science, which is a joint program between our Statistics Department and the Computer Science Department in the College of Engineering. The proposed program is applied in nature and follows our university’s philosophy of learn-by-doing. It was explicitly designed to foster the growth of our existing undergraduate and graduate programs by providing new professional pathways in this highly sought out field and faculty expertise to enhance our existing degree programs.

The MS in Statistics program has been well mapped out, the rational is solid, the proposal is strong with good documentation of the need and marketability of the program. The quality of the program is undergirded by the faculty of our Statistics Department, who are well known and respected nationally, having made significant contributions to their scholarly disciplines and having deep engagement in classroom instruction. Moreover, Hanover Research conducted a thorough market analysis reporting that this program is in high demand by both students and industry.

Taken together, we are very supportive of this MS degree program and have allotted the resources to make it a success. Indeed, we successfully recruited this year a new faculty member that will contribute to the program and as we move beyond the budget challenges presented by COVID-19 pandemic the MS in Statistics is among our college’s highest prioritized programs for adding additional faculty. We believe we can make that happen and we feel strongly that this program will benefit the entire University, by attracting new students and making them more employable. We are happy to follow up for any questions or clarifications needed.

Thank you,

Signed,  
Dean Wendt  
Dean, College of Science and Mathematics  
California Polytechnic State University  

Kellie Green Hall  
Associate Dean  
College of Science and Mathematics
M.S. Statistics – Degree Flowcharts

Pre-requisite map of remedial courses, 400-level required courses, 500-level required courses, and new 500-level Electives:

Example Paths to Degree

2-year with maximum 12 credit remediation

<table>
<thead>
<tr>
<th>Year 1</th>
<th>Fall</th>
<th>Winter</th>
<th>Spring</th>
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<tr>
<td></td>
<td>Stat 425</td>
<td>Stat 426</td>
<td>Stat 427</td>
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<tr>
<td></td>
<td>Stat 331</td>
<td>Stat 323</td>
<td>Stat 466</td>
</tr>
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<td></td>
<td>Stat 334</td>
<td>Stat 550</td>
<td>Stat 500</td>
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<tr>
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<td>Stat 599</td>
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<th>Fall</th>
<th>Winter</th>
<th>Spring</th>
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<td>Stat 566</td>
<td>Stat 590</td>
<td>Stat 590</td>
</tr>
<tr>
<td></td>
<td>Stat 551</td>
<td>500-level elective</td>
<td>Stat 599</td>
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<tr>
<td></td>
<td>Stat 590</td>
<td>Stat 599</td>
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SUPPLEMENT 5
2-year without remediation

<table>
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<th>Fall</th>
<th>Winter</th>
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<tr>
<td></td>
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<td></td>
<td>Stat 551</td>
<td>Stat 550</td>
<td>Stat 466</td>
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<table>
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<th>Year 2</th>
<th>Fall</th>
<th>Winter</th>
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<td></td>
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<tr>
<td></td>
<td>Stat 590</td>
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</table>

Blended program

Taken during B.S., as part of 180-credit degree requirement:

Stat 425, Stat 426, Stat 427, Stat 466

Taken during B.S., not counted towards 180-credit degree requirement:

6 electives (of which two must be 500-level)

Taken during M.S. graduate standing:

<table>
<thead>
<tr>
<th>Year 1</th>
<th>Fall</th>
<th>Winter</th>
<th>Spring</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Stat 551</td>
<td>Stat 550</td>
<td>Stat 590</td>
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REQUISITION INFORMATION

Internal Team: SL-CSM-Statistics - 115300
Recruitment Process:* SL - Faculty Tenure Track
Job Code/Employee Classification:* Instr Fac AY
Job Code: 2360

Salary Range/Grade:* 2360-ASSISTANT PROFESSOR-Grade-3
Minimum: $ 5,046.00
Maximum: $ 11,197.00
Pay Frequency:

CSU Working Title:* Tenure Track Position - Statistics
Campus:* San Luis Obispo
Division:* Academic Affairs-Provost
College/Program:* CSM-College of Science & Math
Department:* CSM-Statistics - 115300
Requisition Number: 504467

OPEN POSITIONS

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REQUISITION DETAILS

Reason:* New Position

SUPPLEMENT 6
**Justification for Recruitment:**

The Statistics Department would like to recruit for one or more tenure-track faculty members to begin in Fall 2021 to support the development of our proposed MS program as well as campus-wide data science efforts. Expectations for both positions include high-quality teaching of courses in Statistics (major, service, and support courses) and engagement in continuing scholarly work and professional development.

These positions are necessary for three reasons. First, we need additional faculty experience and expertise to assist with the delivery of the Cross-Disciplinary Minor in Data Science; and, if approved by the Academic Senate next Fall, the Cross-Disciplinary Minor in Bioinformatics. Our department is collaborating closely with Computer Science on both of these programs. We have three faculty members extensively contributing to these programs: Kelly Bodwin, Hunter Glanz, and Dennis Sun; however, with the growth of interest in our DATA and computing courses (and our major in general) we are having difficulty meeting demand with only these three faculty delivering the computing portions of our curriculum.

Second, we have proposed an M.S. program in statistics that is ready for final campus approval and Chancellor’s office review. Our ability to deliver the proposed curriculum is contingent on a commitment to hire an additional needed tenure-line faculty member.

Third, we continue to offer more and more sections of Statistics courses to more and more students. Many of these students are in service and support courses, but we’ve also seen a marked increase in the number of students taking upper-level courses for Statistics majors and minors in the past few years (see tables below). In particular, the number Statistics majors, and the number of students taking our 300-level courses for Statistics majors and minors, has more than tripled in the past eight years. Our ability to meet demand with qualified part-time faculty is extremely difficult, largely due to our somewhat remote location and high cost of living on the Central Coast. Another tenure-track faculty member is essential to help with meeting student demand for courses.

To see the following tables, please refer to the document attached on the "Documents" tab.

Table 1: Student Credit Units (SCUs) taught by Statistics in Fall with faculty headcounts and tenure density. Note listed year is Dashboard AY, so 2012 refers to Summer 2011 – Spring 2012. (hc = headcount)
Over this period (2012-2021) five TT faculty separated from the department prior to going up for tenure. One faculty separated due to being denied tenure.

Table 2: Enrollments in courses that heavily support our minors in statistics and data science: STAT 325/305 (Introduction to Probability and Simulation), STAT 313 (Applied Experimental Design and Regression Models) STAT 323 (Experimental Design and Analysis), 324/334 (Applied Regression Analysis), STAT 330 (Statistical Computing with SAS), STAT 331 (Statistical Computing with R), and STAT 419 (Multivariate Analysis). Note listed year is Dashboard AY, so 2012 refers to Summer 2011 – Spring 2012.
* Due to budget concerns, we reduced planned offerings of several courses that support our minor this year.

Table 3: Number of STAT majors. Note listed year is Dashboard AY, so 2012 refers to Summer 2011 – Spring 2012.

During COVID, in 2020-21, we had 138 students with declared minors in statistics, 13 in Actuarial Science, and 46 in the Cross-Disciplinary Studies minor in Data Science. These number are similar to counts from 201-20 where we had 140 students minoring in Statistics, 25 minoring in Actuarial Science Preparation, and 53 in the Cross-Disciplinary Studies minor in Data Science. We had In contrast, in 2016 we had 54 students minoring in Statistics and only 3 minoring in Actuarial Science. Our Data Science program was only just introduced and had no official students at that time. We continue to expect that the number of students interested in pursuing undergraduate majors in Statistics will continue to increase in coming years, based on the rapidly increasing numbers taking AP Statistics and very favorable employment prospects.

**Previous/Current Incumbent:**
--

**Work Type:**
Instructional Faculty – Tenured/Tenure-Track

**Hiring Type:**
Probationary

**Job Status:**
Regular

**Time Basis:**
Full Time

**Hours Per Week:**
--

**FLSA Status:**
Exempt
Job Summary/Basic Function: The Statistics Department in the College of Science and Mathematics at California Polytechnic State University, San Luis Obispo, is seeking a full-time, academic year, tenure-track position, with appointment beginning September 12, 2022. Appointment at the Assistant Professor rank is anticipated; higher ranks will be considered. Rank and salary are commensurate with qualifications and experience.

Primary responsibilities will include teaching undergraduate statistics classes to non-statistics majors as well as teaching introductory and upper-level statistics and data science classes for statistics majors and minors. If a proposed master’s program in statistics is approved, responsibilities may also include teaching master’s level statistics courses and supervising graduate students.

It is expected that the successful applicant is committed to quality undergraduate and master’s level teaching, continued scholarly activity, and service to the University. Candidates with an interest in and ability to pursue scholarly projects with students at both the bachelor’s and master’s level are preferred. Applicants with data science and computing experience are especially encouraged to apply.

Minimum Qualifications: --

Required Qualifications:
- Ph.D. in Statistics or closely related discipline.
- Demonstrated experience and commitment to student-centered learning and teaching, as well as the ability to collaboratively work in multidisciplinary settings.
- Demonstrated proficiency in written and oral use of the English language.

Preferred Qualifications:
- Experience with data science and computing.
- Experience in working with diverse populations and fostering a collaborative, supportive and inclusive environment.

Special Conditions: The person holding this position is considered a ‘mandated reporter’ under the California Child Abuse and Neglect Reporting Act and is required to comply with the requirements set forth in CSU Executive Order 1083 as a condition of employment.

Following a conditional offer of employment, a background check (including a criminal records check) must be completed satisfactorily before any candidate may start work with Cal Poly, San Luis Obispo. Failure to satisfactorily complete the background check may result in the withdrawal of the offer of employment. Note: Cal Poly cannot deny an applicant a position solely or in part due to a criminal conviction history until it has performed an individualized assessment and linked the relevant conviction history with specific job duties in the position being sought.

Please note: Current employees who are offered positions on campus will be required to undergo a background check for any position where a background check is required by law or that Cal Poly has designated as sensitive. Sensitive positions are those requiring heightened scrutiny of individuals holding the position based on potential for harm to children, concerns for the safety and security of people, animals, or property, or heightened risk of financial loss to Cal Poly or individuals in the university community.

For health and well-being, Cal Poly is a smoke & tobacco-free campus. The university is committed to promoting a healthy environment for all members of our community.

License / Certifications: --

Supervises Employees:*
- Yes ☐ No

Mandated Reporter:* Limited - The person holding this position is considered a limited mandated reporter under the California Child Abuse and Neglect Reporting Act and is required to comply with the requirements set forth in CSU Executive Order 1083, revised July 21, 2017.

Conflict of Interest:* None

NCAA: ☐ Yes ☐ No

BUDGET DETAILS

Benefit Eligible?: ☐ Yes ☐ No

Anticipated Hiring Range: --

Budget/Chart field/Account string: SL001-115300

Pay Plan: AY

Pay Plan Months Off: --

POSTING DETAILS

Posting Type:* Open recruitment
Review Begin Date: Oct 11, 2021

Advertising Summary:* The Statistics Department in the College of Science and Mathematics at California Polytechnic State University, San Luis Obispo, is seeking a full-time, academic year, tenure-track position, with appointment beginning September 12, 2022. Appointment at the Assistant Professor rank is anticipated; higher ranks will be considered. Rank and salary are commensurate with qualifications and experience.

Advertisement text:*

Job Summary
The Statistics Department in the College of Science and Mathematics at California Polytechnic State University, San Luis Obispo, is seeking a full-time, academic year, tenure-track position, with appointment beginning September 12, 2022. Appointment at the Assistant Professor rank is anticipated; higher ranks will be considered. Rank and salary are commensurate with qualifications and experience.

Primary responsibilities will include teaching undergraduate statistics classes to non-statistics majors as well as teaching introductory and upper-level statistics and data science classes for statistics majors and minors. If a proposed master’s program in statistics is approved, responsibilities may also include teaching master’s level statistics courses and supervising graduate students.

It is expected that the successful applicant is committed to quality undergraduate and master’s level teaching, continued scholarly activity, and service to the University. Candidates with an interest in and ability to pursue scholarly projects with students at both the bachelor’s and master’s level are preferred. Applicants with data science and computing experience are especially encouraged to apply.

At California Polytechnic State University, San Luis Obispo, we believe that cultivating an environment that embraces and promotes diversity is fundamental to the success of our students, our employees and our community. Bringing people together from different backgrounds, experiences and value systems fosters the innovative and creative thinking that exemplifies Cal Poly’s values of free inquiry, cultural and intellectual diversity, mutual respect, civic engagement, and social and environmental responsibility. Cal Poly’s commitment to diversity informs our efforts in recruitment, hiring and retention. California Polytechnic State University is an affirmative action/equal opportunity employer.

Required Qualifications

- Ph.D. in Statistics or closely related discipline.
- Demonstrated experience and commitment to student-centered learning and teaching, as well as the ability to collaboratively work in multidisciplinary settings.
- Demonstrated proficiency in written and oral use of the English language.

Preferred Qualifications

- Experience with data science and computing.
- Experience in working with diverse populations and fostering a collaborative, supportive and inclusive environment.

Special Conditions
The person holding this position is considered a ‘mandated reporter’ under the California Child Abuse and Neglect Reporting Act and is required to comply with the requirements set forth in CSU Executive Order 1083 as a condition of employment.

Following a conditional offer of employment, a background check (including a criminal records check) must be completed satisfactorily before any candidate may start work with Cal Poly, San Luis Obispo. Failure to satisfactorily complete the background check may result in the withdrawal of the offer of employment. Note: Cal Poly cannot deny an applicant a position solely or in part due to a criminal conviction history until it has performed an individualized assessment and linked the relevant conviction history with specific job duties in the position being sought.

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For health and well-being, Cal Poly is a smoke & tobacco-free campus. The university is committed to promoting a healthy environment for all members of our community.

About the Department
The foremost mission of the Statistics Department at Cal Poly is high-quality teaching. The Statistics Department offers a B.S. in Statistics and also minor programs in statistics, data science, and actuarial preparation. An M.S. in Statistics is under review and may begin enrolling students as soon as September 2023. The department also provides support courses for most majors at Cal Poly, as well as some graduate programs, and contributes many courses to the general education program. In support of campus scholarship activities, the department also runs a statistical consulting service. The department faculty is comprised of 20 tenured/tenure-track faculty and 10 lecturers.
About the University

Found in 1901, Cal Poly is one of only five comprehensive polytechnic universities in the nation, with approximately 22,000 undergraduates, 120 postbaccalaureate, and 900 graduate students. U.S. News and World Report has ranked Cal Poly #1 among public master's universities in the western United States for 28 consecutive years. A primarily undergraduate university, Cal Poly offers academically focused students 66 baccalaureate degrees and 27 master's degrees. Operating on the quarter calendar system, Cal Poly takes pride in its "Learn-by-Doing" approach to teaching and learning, which has characterized Cal Poly since its founding. One of the 23 campuses of the California State University system, Cal Poly has a statewide mandate as a polytechnic university. Cal Poly is one of the largest land-holding universities in the nation and uses all of its land holdings in active support of its educational programs. Cal Poly is located in historic San Luis Obispo, a city of 47,000, 12 miles from the Pacific Ocean and midway between San Francisco and Los Angeles on California's scenic Central Coast. With excellent public education resources, recreational facilities and an expanding dedication to the arts, the area is known for its scenic landscapes and extraordinarily temperate climate.

How to Apply

Interested candidates must attach (1) a cover letter, (2) resume/curriculum vitae, (3) diversity statement, (4) teaching philosophy statement, (5) research statement, and (6) a copy of unofficial graduate transcripts. Please be prepared to provide three professional references with names and email addresses when completing the online faculty application. Review of applications will begin October 13, 2021 and will continue until the position is filled.

SEARCH DETAILS

Search Committee Chair: Karen McGaughey
   Email address: kmcgaugh@calpoly.edu

Search Committee Members:
Recipient
SL-CSM-Statistics - 115300:
   Kelly Bodwin
   Matthew Carlton
   Ulric Lund
   Karen McGaughey
   Andrew Schaffner
   Jeffrey Sklar

SELECTION CRITERIA

There are no items to show

USERS AND APPROVALS

Administrative Support: Kimberly Barton
   Email address: kabarton@calpoly.edu

Compliance Panel Facilitator: --
   No user selected.

Additional viewers:
Recipient
   No Additional viewers selected.

Hiring Administrator:* Cassie Stevenson
   Email address: csteve03@calpoly.edu

Approval process:* SL - Faculty Tenure Track Archived 2021
<table>
<thead>
<tr>
<th>Number</th>
<th>Role</th>
<th>Name</th>
<th>Approval Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Department Head/Chair:</td>
<td>Andrew Schaffner</td>
<td>Approved Aug 30, 2021</td>
</tr>
<tr>
<td>2.</td>
<td>College Personnel Manager:</td>
<td>Sharon Arnold</td>
<td>Approved Aug 31, 2021</td>
</tr>
<tr>
<td>3.</td>
<td>College Budget Manager:</td>
<td>Derek Gragson</td>
<td>Approved Aug 31, 2021</td>
</tr>
<tr>
<td>4.</td>
<td>Dean:</td>
<td>Dean Wendt</td>
<td>Approved Aug 31, 2021</td>
</tr>
<tr>
<td>5.</td>
<td>OUDI:</td>
<td>Denise Isom</td>
<td>Approved Aug 31, 2021</td>
</tr>
<tr>
<td>6.</td>
<td>Provost Budget Review:</td>
<td>Edward Rainbolt</td>
<td>Approved Sep 13, 2021</td>
</tr>
<tr>
<td>7.</td>
<td>Provost:</td>
<td>Cynthia Jackson-Elmoore</td>
<td>Approved Sep 13, 2021</td>
</tr>
<tr>
<td>8.</td>
<td>Academic Personnel Representative:</td>
<td>Jennifer Myers</td>
<td>Approved Sep 13, 2021</td>
</tr>
</tbody>
</table>

**HR/Faculty Affairs Representative:**

Jennifer Myers  

Email address: jmyers@calpoly.edu

*Powered by PageUp*
From: John Hausaman <jhausaman@wscuc.org>
Date: Thursday, January 23, 2020 at 11:51 AM
To: Bruno Giberti <bgiberti@calpoly.edu>
Subject: Substantive Change Screening Determination: No further review of program needed

Dear ALO:

Thank you for submitting the Substantive Change Screening form. Following a review of the information submitted, it has been determined that no substantive change review will be necessary for the proposed program.

**Program Implementation Notification Required**
You are required to confirm implementation of the program in order for the program or location to be listed on theWSCUC website for purposes of financial aid eligibility verification by the U.S. Department of Education.

*Login to the [Accreditation Management Portal](https://www.wasc.org) and the Master of Science in Statistics as Active within 30 days of implementation. Failure to report implementation may result in the suspension of financial aid eligibility for enrolled students.*

CONFIDENTIAL COMMUNICATIONS: This email and any files transmitted with it are intended only for the person or entity to which it is addressed and may contain confidential and/or privileged material. Any review, retransmission, dissemination or other use of, or taking any action in reliance upon this information by persons or entities other than the intended recipient is strictly prohibited. If you received this message in error, please contact the sender at the WASC Senior College and University Commission immediately and delete the material.
MEMORANDUM

3/3/22

TO: Andrew Shaffner, Chair, Statistics department
FROM: Joe Borzellino, Director of Enrollment Planning and Management
SUBJECT: Physical Space assessment of MS Statistics proposal

The following is a brief physical space assessment for the proposed MS in Statistics. The review is based on the submitted proposal in addition to email correspondence with the team in Statistics responsible for the proposal.

Office Space:

1. CSM has indicated that they have private faculty office space for the two new tenure-track positions they have hired.
2. Graduate Students will not need office space as they will not be serving as TAs. They will share existing collaboration/research space already assigned to CSM.

Classroom/Lab Space:

1. Proposers have indicated that in addition to their existing studio lab in 38-123, CSM is providing a new shared space 180-272 to accommodate the increase in sections offered to support the MS program.
2. Proposers indicate that they expect 2-4 additional sections per year of elective statistics courses may need to be offered in university classrooms depending on student choice. Undergraduates enrolling in these sections as electives will bring some efficiency.

Summary: Given that CSM has committed to providing most of the instructional space needed to support this proposal, there is minimal impact on university space resources. Statistics has indicated, however, that should demand for their data science curriculum grow they will have a need for an additional studio lab space. Such a space has not been identified by CSM, and until such a space is identified, management of any such increased demand may be necessary to limit adverse impacts on the MS program and existing university space resources.
To: Andrew Schaffner, Professor, Statistics Department Chair  
Date: March 1, 2022  
From: Jeanine Scaramozzino, College of Science and Mathematics Librarian  
Subject: Library Resources Supporting Proposed MA in Statistics

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**SUMMARY**

The library’s existing collections and selection practices will support the proposed MS in Statistics. The curriculum proposal states that required admission to the program and degree course requirements are currently being offered within the university in Statistics, Mathematics, and Computer Software Engineering. The licensed campus GIS and data software and library licensed data sources, reference, and infrastructure support can accommodate the needs of this program. The library’s current collections budget and resources will support existing courses and may accommodate new quarter and semester Statistics courses; however, given the current budget climate is it unlikely that the library will be able to increase or enhance licensing of additional information resources for this program.

**DESCRIPTION OF COLLECTIONS SUPPORTING DEGREE**

**Books and Journals**

Collection development practices favor online materials to increase accessibility of information. In addition, Cal Poly students may borrow ebook chapters and journal articles through Interlibrary Loan Services. Physical books may be borrowed through CSU+ and books not available through CSU+ may be ordered through Interlibrary Services. The primary core and supporting Library of Congress Subject Headings include: HA – Statistics, HD – Include Business Consulting, Q – Science (General), QA – Mathematics, QA75.5-76.95 -Computer Science.

The library has a core collection of ebooks (16,765 titles), print books (1,107 titles), e-journals (686 titles), and print journals (9 titles) in subjects that support a Master’s of Science in Statistics specifically preparing students in careers in statistics and data analysis.

**Scholarly Databases and Additional Electronic Resources**

The library offers the following databases and resource packages to support the program. With additional content resources listed in the topical research guides listed below. Articles that are not available directly from the library may be ordered by students, staff and faculty through Interlibrary Loan Services. Cal Poly and the Chancellors Office provision electronic resources that enable text and data mining (TDM) projects. Researchers may contact the library concerning eligible databases and any publisher requirements for TDM projects.
Topical Research Guides:
- Mathematics & Statistics: https://guides.lib.calpoly.edu/math
- Computer Science: https://guides.lib.calpoly.edu/csc
- Science Resources: https://guides.lib.calpoly.edu/cosam
- Data Sources & Repositories: https://guides.lib.calpoly.edu/datasources
- Government Information and Resources: https://guides.lib.calpoly.edu/governmentinformation

First Line Resources for Math and Statistics:
- Web of Science (All Databases)
  Web of Science All Databases (1864-present) provides the most comprehensive results from +10 databases that primarily cover the sciences plus social sciences and humanities. Databases include the following and more: Science Citation Index (1955-present); Social Sciences Citation Index (1956-present; Emerging Sources Citation Index (2015-present); and Arts & Humanities Citation Index (2004-present).
- MathSciNet via EBSCOhost
  MathSciNet is a searchable database of reviews, abstracts and bibliographic information for mathematical sciences literature, including journals, conference proceedings, and books.
- arXiv.org
  arXiv is a curated research-sharing platform hosting nearly two million scholarly articles in the fields of physics, mathematics, computer science, quantitative biology, quantitative finance, statistics, electrical engineering and systems science, and economics. arXiv offers researchers a broad range of services: article submission, compilation, production, retrieval, search and discovery, web distribution for human readers, and API access for machines, together with content curation and preservation. This source provides in-progress research, preliminary data, etc. that has NOT been peer-reviewed. This platform allows for other researchers to comment and ask questions about the research before it is ready for formal publication.

First Line Resources for Data/Data Sets:
- Statista
  Statista is a statistics portal which provides direct access to quantitative data on media, business, finance, politics, and a wide variety of other areas of interest or markets. The database features unlimited downloads, source citations and direct use or export of results in PowerPoint, Excel PDF and Graphic (PNG) formats.
- RAND California
  RAND California provides information, research reports and statistics on the California economy and public policy issues, as well as access to selected policy reports, statistics, and information at the national and international scale.
- Dataset Search via Google
  Dataset Search is a search engine for datasets. Using a simple keyword search, users can discover datasets hosted in thousands of repositories across the Web.
- Data.gov
  The home of the US government's open data. A comprehensive index of datasets from the US government, including other state, local, and international
agencies. Includes tools and resources to conduct research, develop web and mobile applications, design data visualizations, and more.

First Line Resources for Computer Software Engineering:

- **Engineering Village (Compendex)**
  Compendex is a comprehensive bibliographic database of scientific and technical engineering research, covering all engineering disciplines. It includes millions of bibliographic citations and abstracts from thousands of engineering journals and conference proceedings.

- **IEEE/IET Electronic Library (IEL)**
  The IEEE/IET Electronic Library provides access to full-text documents from publications in electrical engineering, computer science, telecommunications, electronics and related disciplines, including journals, ebooks, standards, and conference proceedings from the Institute of Electrical and Electronics Engineers (IEEE), the Institution of Engineering and Technology (IET), John Wiley & Sons, and MIT Press.

- **O'Reilly Online Learning**
  Formerly known as Safari Books, O'Reilly Online Learning provides access to professional books on topics including UX design, leadership, project management, teams, agile development, analytics, and core programming. In addition to ebooks, learning paths, case studies, and video courses are available.

cc: Tim Strawn, Executive Director, Collection Strategies, Access & Systems
Katherine O’Clair, Associate Dean for Academic Services
Adriana Popsecu, Dean, Library Services
Sarah Lester, CENG Librarian
WHEREAS, Assembly Bill 928 (AB 928), the “Student Transfer Achievement Reform Act of 2021: Associate Degree for Transfer Intersegmental Implementation Committee,” was signed into legislation in October 2021; and

WHEREAS, AB 928 requires a common lower-division General Education (GE) transfer pathway that will meet transfer requirements into both the California State University (CSU) and University of California (UC) systems; and

WHEREAS, AB 928 requires the establishment of the “Intersegmental Committee of Academic Senates” (ICAS) to develop the common GE pathway for transfer students by May 31, 2023, which is expected to impact IGETC; and

WHEREAS, The Standards, Policies & Procedures for Intersegmental General Education Transfer Curriculum says “...some individual colleges or majors within a UC campus may not accept or recommend Intersegmental General Education Transfer Curriculum (IGETC) to fulfill all of their general education requirements” (UC guidance by campus/college/program); and

WHEREAS, It is likely the ICAS will recommend dropping two lower-division courses from CSU GE policy because the IGETC path for the UC requires only 11 lower-division GE courses for transfer students, unlike its stipulation of 12 courses for the CSU (note that CSU GE Breadth, which requires 13 courses, is different from IGETC in its addition of GE Area E); and

WHEREAS, Impact on Existing Policy: None
WHEREAS, AB 928 states that the UC Regents have a choice whether to adopt a resolution regarding a singular lower division GE pathway, while the CSU does not have a choice; and

WHEREAS, The CSU has announced that, following the development of the common GE transfer pathway, the CSU will revise its GE breadth requirements by summer 2024 to comply with the common GE transfer pathway; and

WHEREAS, The Academic Senate appreciates that the CSU must comply with AB 928 for transfer students but notes that the CSU does make exceptions for transfer students using coded memoranda; and

WHEREAS, CSU Coded Memorandum ASA-2018-06 (“Systemwide Credit for External Examinations”) directs campuses how to award GE credit for AP (Advanced Placement), IB (International Baccalaureate), and CLEP (College-Level Examination Program) exams to GE-certified transfer students; and

WHEREAS, The same Coded Memorandum states “Note that each CSU campus determines how it will apply external examinations toward credit in the major. For students not already certified in General Education (GE) and/or American Institutions, the campus also determines how to apply credit from such exams toward the local degree requirements”; and

WHEREAS, This Coded Memorandum clearly establishes a precedent for CSU campuses to maintain the CSU GE curriculum for fulltime freshmen admits, while also prescribing allowances for transfer students’ seamless articulation of GE credits; and

WHEREAS, Cal Poly also currently waives CSU Area E for IGETC-certified transfer students by using an additional GE course; and

WHEREAS, The Academic Senate is committed to improving transfer pathways for transfer students both through GE and by rethinking, where possible, major-required lower-division courses not generally available at community colleges; therefore, be it

RESOLVED: That the Academic Senate urge the Office of the Chancellor to satisfy AB 928 compliance requirements via a 12-course IGETC pathway or, alternatively, via coded memorandum that exempts prospective transfer students from taking all 12 IGETC lower-division courses and, instead, deems them to be transfer ready with only 11 lower-division courses; and be it further
RESOLVED: That this resolution be forwarded to the Office of the Chancellor, all CSU Academic Senate Chairs, and the Academic Senate Statewide Executive Committee.

Proposed by: General Education Governance Board
Date: March 18, 2022

(1) Describe how this resolution impacts existing policy on educational matters that affect the faculty. Examples include curricula, academic personnel policies, and academic standards.

(2) Indicate if this resolution supersedes or rescinds current resolutions.

(3) If there is no impact on existing policy, please indicate NONE.
RESOLUTION ON SCHEDULING OF ONLINE ASSESSMENTS

Impact on Existing Policy: None

1 WHEREAS, Online assessments of student learning are becoming more common; and
2 WHEREAS, Students have personal commitments scheduled outside of class time; and
3 WHEREAS, Students plan these commitments based on their class schedule; and
4 WHEREAS, Online assessments with narrow availability windows may conflict with student personal commitments; and
5 WHEREAS, These time conflicts may fall disproportionately and inequitably on students who need to work and those with dependent care obligations; and
6 WHEREAS, Online assessments that conflict with student personal commitments may harm student success; and
7 WHEREAS, The faculty of Cal Poly are dedicated to student success; and
8 WHEREAS, Online assessments with broad availability windows alleviate such conflicts; therefore be it
9 RESOLVED: The Academic Senate endorses the attached guidance for administering online assessments, and be it further
10 RESOLVED: The Academic Senate will ask the Registrar to circulate this guidance at the beginning of each academic year.

Proposed by the Academic Senate Instruction Committee
Date: March 29, 2022
Guidance for Scheduling of Online Assessments

Background
Prior to the rapid transition to online instruction necessitated by the COVID-19 pandemic, most exams, quizzes, and other types of assessment were administered in person during regularly scheduled class meetings; final exams and other final assessments were administered during the scheduled final exam time. During the campus closure starting in March of 2020, most assessments were conducted online. While Cal Poly has returned to predominantly in-person instruction for the 2021-22 academic year, it is likely that online assessments will continue to be used more frequently than in the pre-pandemic era.

Before Cal Poly offered online assessments, students were better able to plan their schedules so that other responsibilities would not conflict with their class assessments. Since then, online assessments have become more widespread, and some students in courses have been required to complete online assessments with a short assessment availability window, outside of the regularly scheduled class time. Some classes scheduled for asynchronous online delivery have required students to take assessments synchronously at a specific date and time within a short assessment availability window. In some instances, the assessment availability window has been as short as 30 – 60 minutes. These practices have created conflicts for students required to complete an assessment at the same time that they had other scheduled obligations such as a scheduled class meeting for another course, employment, family care responsibilities, or a school-related event. This could compromise student success if students must choose between taking an online assessment, or missing another class, or having to take time off work.

Faculty can avoid creating these conflicts by adhering to the following guidance.

Guidance

Availability Window Definition
For the purposes of this document, the assessment availability window is the time during which a student can choose to complete an exam, quiz, or other assessment. This is not the same as the time limit for the assessment. For instance, an exam with a 90-minute time limit to complete, could have an assessment availability window from Monday at 6 AM until Tuesday at 6 PM. The student could start the exam anytime in the 36-hour assessment availability window but would have to finish within 90 minutes of starting the exam.

During the Instructional Period (Not including Finals Week)
1. For classes with a scheduled meeting time, assessments administered online should be offered during the regularly scheduled class meeting time or have an assessment availability window of at least 24 hours; assessment availability windows can include weekend days, but at least 24 hours of the window should be on a weekday.

2. For classes with a scheduled meeting time, for nightly assignments submitted in class or online, the completion/submission availability window should be a least 24 hours, or for classes that meet on successive days, the complete time interval between class
meetings.
3. For classes without a scheduled meeting time, assessments administered online should have an assessment availability window of at least 24 hours; assessment availability windows can include weekend days, but at least 24 hours of the window should be on a weekday.
4. Faculty are strongly encouraged to set the assessment availability window for online assessments to at least 36 hours; at least 24 of those hours should be on a weekday.

During the Last Week of Classes for lab courses, activity courses, and 1-unit lecture courses
1. For classes with a scheduled meeting time, final assessments administered online should occur during the scheduled class meeting time or have an assessment availability window of at least 48 hours. The day and time of the final assessment or the assessment availability window for the final assessments should be included in the syllabus on the first day of class.
2. For classes without a scheduled meeting time, final assessments administered online should have an assessment availability window of at least 48 hours and the assessment availability window for the final assessment should be included in the syllabus on the first day of class.
3. Faculty are strongly encouraged to set the assessment availability window for online final assessments to 72 hours or more.

During Finals Week for lecture courses of two or more units
1. For classes with a scheduled meeting time, final assessments administered online should be offered during the time posted in the final exam schedule or have an assessment availability window of at least 48 hours during finals week (Monday-Friday). The day and time of the final assessment or the assessment availability window for the final assessments should be included in the syllabus on the first day of class.
2. For classes without a scheduled meeting time, final assessments administered online should have an assessment availability window of at least 48 hours during final exam week (Monday-Friday) and the assessment availability window for the final assessment should be included in the syllabus on the first day of class.
3. Faculty are strongly encouraged to set the assessment availability window for online final assessments to 72 hours or more.
Adopted:

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

AS-___-22

RESOLUTION TO ESTABLISH SEMESTER TERMS

WHEREAS, the California State University Chancellor’s Office has directed Cal Poly to convert from quarters to semesters beginning in fall 2026; and,

WHEREAS, a rationale given by the Chancellor’s Office for converting from quarters to semesters is to align Cal Poly’s academic calendar with the other campuses in the Cal State University System; and,

WHEREAS, the Collective Bargaining Agreement (CBA) states that “[t]he work year of an academic year employee shall not exceed one hundred eighty (180) workdays or days in lieu thereof. This provision shall not preclude the establishment of an academic year calendar equaling less than one hundred eighty (180) days. The campus academic calendar shall establish workdays of academic year employees” (20.4); and,

WHEREAS, Cal Poly’s Campus Administrative Policies (CAP) states that “[t]he typical academic year shall consist of 147 instructional days. From year-to-year a variation of plus or minus two days is permissible. There shall be a minimum of 170 academic workdays in the academic year. There shall be a maximum of 180 academic workdays in the academic year” (CAP 211.1); and

WHEREAS, 13 of the 23 California State University campuses offer a winter and/or May intersession period for student to maintain progress to degree; therefore be it

RESOLVED: that the Academic Senate approve the attached “Establishment of Semester Terms.”

Proposed by: Academic Senate Ad Hoc Semester Conversion Committee
Date: April 19, 2022
Academic Senate Ad Hoc Quarter to Semester Committee
Establishment of Semester Terms

Executive Summary

The university shall establish an academic calendar that includes:
• 16-week (instruction + finals) fall and spring semesters
• summer term that offers variable length sessions
• winter intersession period for instruction
• two 7.5-week modules in both the fall and spring semesters

The Academic Senate
• shall designate appropriate collaborative committees to establish additional guidelines regarding the winter intersession period and modules
• strongly recommends that winter intersession courses and summer sessions be offered through state-side support to ensure equitable access for all students

Part 1: Semester Term Lengths

Background
The quarter-to-semester conversion process requires the alteration of the academic term length at Cal Poly beginning in fall 2026. Academic terms are governed by existing policies regarding the number of instructional days during the academic year and the number of workdays required by faculty members during the academic year. According to the 2022-24 Collective Bargaining Agreement (CBA), “The work year of an academic year employee shall not exceed one hundred eighty (180) workdays or days in lieu thereof. This provision shall not preclude the establishment of an academic year calendar equaling less than one hundred eighty (180) days. The campus academic calendar shall establish workdays of academic year employees” (20.4). According to the Campus Administrative Policies (CAP), “The typical academic year shall consist of 147 instructional days. From year-to-year a variation of plus or minus two days is permissible. There shall be a minimum of 170 academic workdays in the academic year. There shall be a maximum of 180 academic workdays in the academic year” (CAP 211.1). Currently, the academic year is divided into three quarters (Fall, Winter, Spring). The summer session is not considered part of the academic year. Every year, the academic calendar proposals are reviewed by various stakeholders across campus, including department chairs and heads, deans, members of Student Affairs, the Academic Senate Instruction Committee, and the Academic Senate Executive Committee, and the President determines the academic calendar. Across the California State System, each campus establishes its own start and end date for academic terms, including the length of the final examination period (see Table 1).
As part of the Graduate Initiative 2025 (GI 2025), the California State University has prioritized student access to classes, graduation rates, and student success. Cal Poly has consistently made progress toward the GI 2025 targets for 4- and 6-year First-Time Student and 2- and 4-year Transfer Student graduation rates and in eliminating graduate gaps (see Tables 2 and 3).

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To provide increased student access to classes and maintain student progress to degree, 13 of the 23 California State University campuses offer a winter and/or May intersession periods.

**Table 2: Cal Poly Graduation Rates 2018-2021**

<table>
<thead>
<tr>
<th></th>
<th>2018</th>
<th>2019</th>
<th>2020</th>
<th>2021</th>
<th>CSU ESTABLISHED 2025 TARGET</th>
</tr>
</thead>
<tbody>
<tr>
<td>First-Time Student 4-year</td>
<td>52.5%</td>
<td>57%</td>
<td>59.6%</td>
<td>60.7%</td>
<td>71%</td>
</tr>
<tr>
<td>First-Time Student 6-year</td>
<td>81.7%</td>
<td>82%</td>
<td>83.1%</td>
<td>85.2%</td>
<td>92%</td>
</tr>
<tr>
<td>Transfer Student 2-year</td>
<td>35.3%</td>
<td>36.1%</td>
<td>37%</td>
<td>37.4%</td>
<td>45%</td>
</tr>
<tr>
<td>Transfer Student 4-year</td>
<td>90.1%</td>
<td>85.1%</td>
<td>87.3%</td>
<td>84.8%</td>
<td>93%</td>
</tr>
</tbody>
</table>

**Table 3: Cal Poly Gap Data 2018-2021**

<table>
<thead>
<tr>
<th></th>
<th>2018</th>
<th>2019</th>
<th>2020</th>
<th>2021</th>
<th>CSU ESTABLISHED TARGET</th>
</tr>
</thead>
<tbody>
<tr>
<td>Underrepresented Minority 6-year Gap</td>
<td>9.4%</td>
<td>7.9%</td>
<td>7.4%</td>
<td>5.6%</td>
<td>No Gap</td>
</tr>
<tr>
<td>Pell Grant Recipient 6-year Gap</td>
<td>7.7%</td>
<td>5.7%</td>
<td>6.4%</td>
<td>5.0%</td>
<td>No Gap</td>
</tr>
</tbody>
</table>

**Establishment of an Intersession Period**

To increase student access to classes, maintain student progress to degree, and facilitate Cal Poly’s progress toward the CSU’s GI 2025 targets, the university shall establish an academic calendar that includes a winter intersession period for instruction that maintains a reasonable alignment with the spring semester start and end dates of other campuses in the California State University system. Intersession courses shall follow the credit hour requirements established by the WASC Senior College and University Commission’s “Credit Hour Policy” and the Academic Senate “Resolution on Review of Courses with Condensed Time Schedules” (AS-838-17) (see Background Information).

The Academic Senate shall designate an appropriate committee (or committees) to collaborate with the Office of the Registrar and other campus stakeholders across the university to establish additional guidelines regarding the winter intersession period. The Academic Senate strongly recommends that winter intersession courses be offered through state-side support to ensure equitable access for all students.

**Part 3: Establishment of Modules**

**Background**

Several polytechnic universities on the semester system offer modules during within the semester terms to achieve their academic goals. Rochester Institute of Technology offers 7-week online sessions every semester (see [https://www.rit.edu/calendar](https://www.rit.edu/calendar)). Worcester Polytechnic Institute offers 7-week sessions across 5 different terms ([https://go2.wpi.edu/wpi-](https://go2.wpi.edu/wpi-))
online-term-start-dates). A prominent non-polytechnic university, Arizona State University, offers two 7.5-week sessions, both online and in-person, every semester (https://students.asu.edu/academic-calender). As Cal Poly converts from quarters to semester, modules within the semester provide the opportunity to advance the university’s mission as a comprehensive polytechnic university.

Establishment of Modules within Semester Terms
The university shall establish an academic calendar that includes two 7.5-week modules in the fall semester and two 7.5-week modules in the spring semester. Courses offered through modules shall follow the credit hour requirements established by the WASC Senior College and University Commission’s “Credit Hour Policy” and the Academic Senate “Resolution on Review of Courses with Condensed Time Schedules” (AS-838-17) (see Background Information).

The Academic Senate shall designate an appropriate committee (or committees) to collaborate with the Office of the Registrar and other campus stakeholders across the university to establish additional guidelines regarding modules.
Part 4: Background Information

Credit Hour Policy

Academic credit has provided the basis to measure the amount of engaged learning time expected of a student enrolled in traditional classroom settings, laboratories, studios, internships, independent studies, and distance education programs. Credit hours are a commonly accepted means of measuring student engagement for multiple purposes, including the transfer of students from one institution to another and the award of financial aid. While this credit hour policy is intended to provide guidance to institutions and peer reviewers with expectations for compliance, the Commission is open to innovative ways to measure student learning and academic engagement.

Definition of Credit Hour

The Commission defines credit hour as an amount of work represented in intended learning outcomes and verified by evidence of student achievement that is an institutionally established equivalency that

1. Approximates not less than:
   a. One hour of classroom or direct faculty instruction and a minimum of two hours of out-of-class student work each week for approximately fifteen weeks for one semester or trimester hour of credit, or 10 to 12 weeks for one quarter hour of credit, or the equivalent amount of work over a different amount of time; or
   b. At least an equivalent amount of work as required in paragraph 1.a. of this definition for other academic activities as established by the institution including laboratory work, internships, practica, studio work, and other academic work leading to the award of credit hours; and

2. Permits an institution, in determining the amount of work associated with a credit hour, to take into account a variety of delivery methods, measurements of student work, academic calendars, disciplines and degree levels. Institutions have the flexibility to award a greater number of credits for courses that they can show require more student work.

Review of an Institution's Credit Hour Policy and Procedures

Commission peer review teams will evaluate, as part of all seeking accreditation and comprehensive reviews for reaffirmation of accreditation, the extent to which institutions meet the Commission’s definition of a credit hour, by examining:
1. The adoption of a policy on credit hour for all courses and programs at the institution.
2. The processes the institution employs to review periodically the application of its policy on credit hour across the institution to assure that credit hour assignments are accurate, reliable, and consistently applied.
3. Any variations in the assignment of credit hours to assure that they conform to commonly accepted practices in higher education.

In implementing this policy, teams will use the Credit Hour and Program Length Form to review institutional documentation:

- The institution’s policy on credit hour including expectations at each degree level;
- An explanation of the institution’s process for periodic review of the application of this policy;
- Evidence of the implementation of institutional review processes to assure the reliability and accuracy of credit hour assignments in all courses and programs; for example, as part of program review, process for new course approval, or periodic audits; and
- Evidence that the institution’s assignment of credit hours conforms to commonly accepted practice in higher education, through sampling a variety of course syllabi based on degree level, academic discipline, delivery modes, and types of academic activities.

In addition, the substantive change committee process includes a review of credit hour assignments and validation of an institution’s credit hour policy. Additional protocols for implementation of this policy may be developed to assist institutions and teams in conducting reviews under this policy.

Approved by the Commission, November 2011 Revised, November 2020
WHEREAS, Courses are being re-packaged in new and interesting ways, including international studies classes, during time periods outside of the traditional ten-week quarter, or as summer experiences; and

WHEREAS, No Academic Senate Curriculum Committee review is currently required for these types of course offerings except for when the courses are originally proposed; and

WHEREAS, Coded Memorandum AA-2011-14 from the Chancellor’s Office defines a credit hour as “the amount of work represented in intended learning outcomes and verified by evidence of student achievement that is an institutionally established equivalency that reasonably approximates not less than: one hour of classroom or direct faculty instruction and a minimum of two hours of out-of-class student work each week for approximately fifteen weeks for one semester or trimester hour of credit, or ten to twelve weeks for one quarter hour of credit, or the equivalent amount of work over a different amount of time”; and

WHEREAS, A one-unit course during a quarter translates to approximately 30 total hours of student work; and

WHEREAS, It may prove difficult to attain the approved Course Learning Objectives if students are expected to work more than 10 hours in any given day; therefore be it

RESOLVED: That any existing course or group of courses that in its new condensed format averages less than three days per unit must be approved by the appropriate College Curriculum Committee(s) and the Academic Senate Curriculum Committee at least 60 days before they are offered.

Proposed by: Academic Senate Curriculum Committee
Date: May 3, 2017

Adopted: June 6, 2017
MEMORANDUM
Cal Poly | Office of the President

To: Dustin Stegner
Chair, Academic Senate

From: Jeffrey D. Armstrong
President

Date: July 17, 2017

Copies: K. Enz Finken
M. Pedersen
B. Tietje
C. Moore
C. Sunata
G. Bohr

Subject: Response to Academic Senate Resolution AS-838-17
Resolution on Review of Courses with Condensed Time Schedules

This memo acknowledges receipt of the above-entitled Academic Senate resolution. I understand from the resolve clause that resolution AS-838-17, as approved by the Academic Senate, only applies to existing courses that have not yet been offered in a condensed format, averaging less than three days per unit. I expect that the Academic Senate, Academic Programs and Planning, and the Office of the Registrar will work together to resolve any processual issues related to the proposed curricular review.

RECEIVED
AUG - 1 2017

ACADEMIC SENATE
RESOLUTION ON AB 928 AND CSU GE GOLDEN FOUR

Impact on Existing Policy: None

WHEREAS, Assembly Bill 928 (AB 928), the “Student Transfer Achievement Reform Act of 2021: Associate Degree for Transfer Intersegmental Implementation Committee,” was signed into legislation in October 2021; and

WHEREAS, AB 928 requires a common lower-division General Education (GE) transfer pathway that will meet transfer requirements into both the California State University (CSU) and University of California (UC) systems; and

WHEREAS, AB 928 requires the establishment of the “Intersegmental Committee of Academic Senates” (ICAS) to develop the common GE pathway for transfer students by May 31, 2023; and

WHEREAS, For the Intersegmental General Education Transfer Curriculum (IGETC), the UC system seems to require 11 lower-division courses while the CSU requires 12 lower-division courses; and

WHEREAS, The CSU has announced that, following the completion of the common GE pathway for transfer students, systemwide GE policy will be changed to conform with the common GE pathway by summer 2024; and

WHEREAS, It is likely the ICAS will recommend an 11-course lower-division GE transfer pathway; and

WHEREAS, The current CSU GE policy requires that all students successfully complete the “Golden Four” (A1: Oral Communication, A2: Written Communication, A3: Critical Thinking, and B4: Quantitative Reasoning); and
WHEREAS, it is the impression of many CSU faculty and Academic Senates that the Chancellor’s Office, based on the ICAS template, will consolidate some of the learning outcomes of the Golden Four; and

WHEREAS, in particular, CSU Oral Communication (Area A1) is suspected to be absorbed by some of the other courses in the Golden Four because the UC does not require a course in oral communication; and

WHEREAS, other possible courses to be dropped from CSU GE are Area E: Lifelong Learning and Self-Development, which is outside of the Golden Four, and Area A3: Critical Thinking (even though critical thinking is part of the UC IGETC pathway) (UC transfer IGETC advice); and

WHEREAS, courses in these areas are important to student learning because they provide students with employable skills, teach them how to advocate for social justice, function as an equalizer for students from all backgrounds and experiences, and help to prepare students to respond to misinformation; and

WHEREAS, both oral communication and critical thinking are core competencies for WASC Senior College and University Commission (WSCUC), the CSU and UC accrediting agency (WSCUC Core Competencies); and

WHEREAS, the remaining two courses in the Golden Four are already full of content in order to satisfy their learning objectives and cannot absorb the A1: Oral Communication or the A3: Critical Thinking learning objectives in an educationally effective manner; and

WHEREAS, the Academic Senate notes that it is misleading to say that the UC requires 11 lower-division courses for IGETC because very few UC campuses actually require 11 lower-division courses for transfers; and

WHEREAS, complying with AB 928 by dropping one or two courses from the CSU IGETC list will not and can not secure a common transfer pathway for transfer students as long as IGETC decisions can be made not just at a UC campus level, but at a UC college level, let alone consideration of the UC “Basic Requirements”; therefore be it

RESOLVED, the disciplines in the CSU Golden Four represent essential, foundational learning not only for the GE curriculum, but for every major curriculum as well; and be it

RESOLVED, that in light of the decades-long educational value the CSU has many times confirmed, courses in oral communication, lifelong learning, and
critical thinking should be upheld, and the Golden Four disciplines should
be retained as distinct areas within CSU GE and IGETC; and be it
RESOLVED: That this resolution be forwarded to the Office of the Chancellor, all CSU
Academic Senate Chairs, and the Academic Senate Statewide Executive Committee.

Proposed by: General Education Governance Board
Date: March 18, 2022

(1) Describe how this resolution impacts existing policy on educational matters that affect the faculty. Examples include curricula, academic personnel policies, and academic standards.
(2) Indicate if this resolution supersedes or rescinds current resolutions.
(3) If there is no impact on existing policy, please indicate NONE.