WHEREAS, The Department of Food Science and Nutrition has a history of preparing Master students for careers in food science, such as food safety, food sensory, food chemistry, product development, and food engineering and processing; and

WHEREAS, The purpose of the proposed Master of Science in Food Science is to provide graduate students with the knowledge, advanced critical thinking, skills, ethics and experiences necessary to address current and future food science related challenges, and meet the workforce demand in a sector of employment that is expected to increase with the difficulties and challenges to address growing world population, sustainability of our food production, and development of healthy and nutritious food; and

WHEREAS, The faculty in the Food Science and Nutrition Department have the expertise to deliver a Master of Science in Food Science program that aligns with the most recent critical component elements identified by the Institute of Food Technologists: Food Safety & Defense, Food Health & Nutrition, Product Development, Food Processing & Packaging, and Sustainability; and

WHEREAS, There is substantial interest by California Polytechnic, national and international students who desire the opportunity to pursue their education with a Master of Science in Food Science as a pathway to food science careers; and

WHEREAS, Only our sister CSU institution Cal Poly Pomona and our competitor institution in the UC system, UC Davis, has a graduate degree in Food Science; and

WHEREAS, The Food and Beverage processing in California accounts directly for $25.2 billion in value added and 198,000 jobs and is engaged in vital strategies to continue to produce and deliver food nationally and internationally, and Cal Poly graduates with a Master of
Science in Food Science will successfully contribute to these efforts; therefore be it

RESOLVED: That the proposed new degree program for the Master of Science in Food Science be approved.

Proposed by: Stephanie Jung, Professor, on behalf of the Food Science Faculty
Date: May 10, 2018
Proposal for New CSU Degree

Master of Science in Food Science

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

Date
Faculty Check List

✓ Title 5 requirements for proposed master’s degree have been met, including:
  ✓ minimum of 30 semester units of approved graduate work are required
  ✓ no more than 50% of required units are organized primarily for undergraduate students
  ✓ maximum of 6 semester units are allowed for thesis or project
  ✓ Title 5 requirements for master’s degree culminating experience are clearly explained.
  ✓ for graduate programs, at least five-full time faculty with terminal degrees in appropriate disciplines are on staff.
1. PROGRAM TYPE

a. State-support

c. Delivery Type: Fully face to face

g. New Program

2. PROGRAM IDENTIFICATION

a) Campus

California Polytechnic State University, San Luis Obispo

b) Full and exact degree designation and title

Master of Science (MS) in Food Science

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

March 2013

d) Term and academic year of intended implementation

Fall 2019

e) Total number of units required for graduation

45 quarter units

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

Food Science and Nutrition (FSN) Department

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

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

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

Support letter from Mary Pedersen, Senior Vice Provost, Academic Programs and Planning (Appendix 1).
Any other campus approval documents that may apply (e.g. curriculum committee approvals) appear in Appendix 2.

Please specify whether this proposed program is subject to WASC Substantive Change review. The campus is required to either attach a copy of the WASC Sub-Change proposal or submit that document in lieu of the CSU proposal format. Submitted WASC Substantive Change Screening Form and notified on January 31, 2018 that no substantive change review will be necessary.

k) Proposed Classification of Instructional Programs (CIP) Code

CSU Code: 01131 Food Science; CIP: 01.1001

3. PROGRAM OVERVIEW AND RATIONALE

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

Brief Description/Purpose

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

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

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

This program will replace the current MS in Agriculture with a Specialization in Food Science. It is, therefore, an elevation of the existing MS in Agriculture with a specialization in Food Science to an MS in Food Science.
Strengths
Program strengths include: 1) the strategic alignment of the program emphasis areas established to support the demanding job market and societal needs for professionals in these areas, and 2) an existing on-campus network of faculty experts that will provide the structure to graduate students with expertise in these various emphasis areas.

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

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

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

Justification for Offering the Program at This Time/Rationale
There are several factors that contribute to the need of this MS in Food Science and make this proposal justified at this time.
- One of them is the key role of the state of California in the food industry. According to a report published by the California League of Food Processors in January 2015, food and beverage processing is California's third largest manufacturing sector, responsible for a total...
of 760,000 jobs. In the past couple of years, the food industry’s demand for MS students has significantly increased, with the MS degree becoming the new norm and replacing the BS degree. There is an increased demand from the food industry for students who possess strong critical thinking skills. Such skills are emphasized within the proposed MS Food Science. The need for more students with a background in food science is illustrated by the letters of support we received from leaders of companies in the food industry (Appendix 12). As an example, Rob Neenan, President of the California League of Food Processors (CLFP), emphasizes that “the number of university graduates is not keeping pace with demand, especially with respect to students with graduate degrees” (Appendix 12).

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

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

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

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

Currently, there are a total of 5 undergraduate food science programs in California. Only two of them, Cal Poly San Luis Obispo (BS Food Science with concentration in Advanced Food Science) and UC Davis, are approved by The Institute of Food Technologists. The field of food science is important for many disciplines across campus. For example, for engineers, a career in the food industry could be an attractive option but they lack the specialized knowledge in Food Science. The same applies for students from chemistry, packaging, or microbiology. It is not unusual for students with an undergraduate degree in these fields to be interested in an MS in Food Science. These students might also be interested in taking some of our graduate courses, while being in another graduate program on campus.
Having students from other departments in our graduate courses will help ensure a critical mass of students for course enrollments, and provide support for diversity initiatives. The proposed program has much campus-wide support from a broad range of stakeholders. Appendix 11 contains letters of support for this proposal from Heads/Chairs from the following departments/units/programs: Wine and Viticulture, Industrial Technology & Packaging, Animal Science, and the Cal Poly Dairy Innovation Institute. Support of various Departments through signed Memorandums (Appendix 5) was provided by the following Departments: Statistics, Animal Science, Chemistry & Biochemistry, Civil & Environmental Engineering, Microbiology)

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

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

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

**Admission Requirements**
A student shall at the time of enrollment:

- Have completed a four-year college course of study and hold an acceptable baccalaureate degree from an institution accredited by a regional accrediting association, or shall have completed equivalent academic preparation as determined by appropriate campus authorities.
- Be in good standing at the last college or university attended.
- Have attained a grade point average of at least 3.0 (A = 4.0) in the last 60 semester (90 quarter) units attempted or have earned a grade point average of at least 3.0 on the last degree completed by the candidate.
- Satisfactorily meet the professional, personal, scholastic, and other standards for graduate study, including qualifying examinations, as appropriate campus authorities may prescribe. Have your GRE results reported to Cal Poly Admissions (Institutional Code 4038) and self-report the results in your application.
- Students in the process of completing a baccalaureate degree may be admitted on a provisional basis, subject to proof of degree completion, if their cumulative GPA is at least 3.0. An official transcript showing degree completion must be submitted or the offer of admission will be withdrawn.
To be considered, students should fill an application for Graduate Admission via https://www2.calstate.edu/apply. The deadlines for application are specified at http://admissions.calpoly.edu/applicants/
- Program specific requirements must be submitted via Cal State Apply. These include:
  o Statement of purpose
  o Transcript(s) from institution granting bachelor's degree
  o Curriculum Vitae
  o Three letters of academic and/or professional recommendation.
  o Results from Graduate Record Examination (GRE standard test); quantitative, verbal and writing scores should be at the 50th percentile or higher for consideration.
  o Language proficiency requirement. This requirement does not apply if country of citizenship is listed on Cal Poly Admissions website:
    http://admissions.calpoly.edu/applicants/international/checklist.html
All applicants who do not speak and write English as their primary language are required to complete the Test of English as a Foreign Language (TOEFL), taken within the last 2 years with a minimum score of 550 (paper version), 213 (computerized version), or 80 (Internet based). Submit scores electronically to Institution Code: 4038.

Applicants who lack the required preparatory coursework in basic sciences must complete these courses (either before being admitted or once admitted). Basic sciences courses include the following:
- General Chemistry: CHEM 127 General Chemistry for Agriculture and Life Science I
  CHEM 128 General Chemistry for Agriculture and Life Science II
  CHEM 129 General Chemistry for Agriculture and Life Science III
  CHEM 212 Introduction to Organic Chemistry
  CHEM 216 Organic Chemistry I
  CHEM 217 Organic Chemistry II
- Biochemistry: CHEM 313 Survey of Biochemistry and Biotechnology
  CHEM 371 Biochemical Principles (CHEM 217 is required)
- Nutrition: FSN 210 Nutrition

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

All degree requirements, including catalog number, course title, and number of units
Required courses
All core requirements appear in Table 3.b.1 below.
<table>
<thead>
<tr>
<th>Catalog number</th>
<th>Course title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>FSN 505</td>
<td>Orientation to graduate research</td>
<td>1</td>
</tr>
<tr>
<td>FSN 599</td>
<td>Thesis</td>
<td>9</td>
</tr>
<tr>
<td>STAT 513</td>
<td>Applied Experimental Design and Regression Models</td>
<td>4</td>
</tr>
<tr>
<td>SS 501</td>
<td>Research Planning</td>
<td>4</td>
</tr>
<tr>
<td>FSN 564</td>
<td>Chemistry of Food Systems</td>
<td>4</td>
</tr>
<tr>
<td>FSN 575</td>
<td>Advanced Food Safety</td>
<td>4</td>
</tr>
<tr>
<td>FSN 581</td>
<td>Food Science Seminar – Sustainability</td>
<td>3</td>
</tr>
</tbody>
</table>

**Total required coursework** 29

The supervisor-approved electives (400-500 level) may vary with the student’s background. Some options are summarized based on research emphasis area the student might have on Microbiology/Food Safety, Sensory/Product Development, Food Chemistry; Sustainability, Meat Science/Dairy Science. (Refer to the list below)

**Total units needed for graduation** 45

**Forms to submit**

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

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

**Requirements**
The Formal Study Plan must include at least 45 units of committee-approved graduate coursework (including degree-required and elective coursework). At least 60% of the units on the Formal Study Plan must be at the 500 level. A minimum GPA of 3.0 is required for coursework in the Formal Study Plan. All students must meet the University’s current
Graduation Writing Requirement. In addition, all students must pass an oral defense of the thesis and satisfactorily complete the written thesis.

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

**4. CURRICULUM**

Describe outcomes (also sometimes known as goals) for the 1) institution, 2) program, and for 3) student learning. Institutional learning outcomes (ILOs) typically highlight the knowledge, skills, and dispositions all students are expected to have upon graduating from an institution of higher learning. Program learning outcomes (PLOs) highlight the knowledge, skills, and dispositions students are expected to know as program graduates. PLOs are more narrowly focused than ILOs. Student learning outcomes (SLOs) clearly convey the specific and 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.

**Institutional Learning Outcomes at Cal Poly**

**University Learning Outcomes (ULOs)**

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

ULO 1. Think critically and creatively
ULO 2. Communicate effectively
ULO 3. Demonstrate expertise in a scholarly discipline and understand that discipline in relation to the larger world of the arts, sciences, and technology
ULO 4. Work productively as individuals and in groups
ULO 5. Use their knowledge and skills to make a positive contribution to society
ULO 6. Make reasoned decisions based on an understanding of ethics, a respect for diversity, and an awareness of issues related to sustainability
ULO 7. Engage in lifelong learning

**Program Learning Outcomes (PLOs)**

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

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

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

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

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

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

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

Assessment of learning outcomes of the MS Food Science program will include:

- direct assessment methods
- and indirect assessment methods

Direct methods

Performance of students will be established based on the following:

- **Performance in required and elective coursework.** Performance in each course in the Food Science MS will be based on achievement of the course learning outcomes, which directly relate to the MS Food Science program outcomes. Part of our student learning outcomes assessment will be based on assignments with a goal that 80% of Food Science MS students will meet the SLOs in all courses in the Formal Study Plan. The specified assignments are summarized in Table 4.b.2. The steps that will be implemented to evaluate assessments are: 1) instructors assign student work and, when appropriate, provide rubric(s) to students; (2) instructors collect and score assignments using rubric(s); (3) instructors summarize the data (how many "does not meet expectations", "meets expectations", and "exceeds expectations"); (4) instructors provide 2-3 representative assignments for each level of performance.

- **Rubric evaluation of written MS theses.** Conducted every year. 100% of theses will be evaluated, each by 3 faculty members, with at least 2 of them having core expertise in food science and the third member being outside the department and having expertise that can benefit the student’s progress. A copy of the rubric is in Appendix 3. Our goal will be that at least 80% of students achieve a grade of 3 or higher (on a scale of 1-4) on all thesis-related learning outcomes. The thesis-related learning outcomes in the rubric are derived directly from the Student Learning Outcomes described earlier, although some have been broken down into multiple specific and measurable components. Students will be required to fill out this rubric evaluation and turn it in to the committee at the beginning of the oral defense. It should help the student understand what criteria will be used to evaluate his/her work and give an opportunity for the students to reflect on the quality of their thesis.

- **Rubric evaluation of oral defense.** The written thesis rubric includes one component that will be evaluated during the oral defense. In addition, a separate rubric matrix for the oral defense will be used (Appendix 4). This rubric will be available for students,
staff, and faculty attending the defense and for the student’s thesis committee. Similarly, our goal will be that at least 80% of students achieve a grade of 3 or higher (on a scale of 1-4) on all thesis-related learning outcomes.

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

- **Exit survey and interview.** The survey will be sent electronically to every student after the MS defense and before the exit interview, and it will include perception of level of achievement of Student Learning Outcomes (see outcomes listed in section 4.a.) as well as questions about strengths and weaknesses of the MS Food Science in order to assess the effectiveness of the program and to improve the program over time. The interview will then be performed by a mediator from the Center for Teaching, Learning and Technology. Comments collected with the survey will be discussed during the exit interview. Data will be compiled and analyzed every year. Non-Cal Poly email addresses will be collected for the purpose of reaching the students for Alumni survey.

- **Alumni survey.** The survey will be conducted every 5 years, beginning the 5th year following initiation of the MS Food Science, to include graduates one year and more beyond degree completion. The survey will assess the perceived value of the MS degree for success in subsequent schooling or employment, and seek input on important strengths and weaknesses of the program in order to assess the effectiveness of the program.
<table>
<thead>
<tr>
<th>University Learning Outcomes (ULO)</th>
<th>Program Learning Outcomes (PLO)</th>
<th>Student Learning Outcomes (SLO)</th>
<th>Required Courses and Other Elements of MS Program</th>
</tr>
</thead>
<tbody>
<tr>
<td>ULO 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 1. Demonstrate technical competency in the discipline of food science</td>
<td>SLO 1. Apply fundamental principles of food science in research and required coursework</td>
<td>FSN 505 Orientation to grad research</td>
</tr>
<tr>
<td>ULO 1. Think critically and creatively</td>
<td>PLO 2. Design, analyze, interpret, and communicate food science research</td>
<td>SLO 2. Demonstrate independent and creative thinking skills in the formulation, design, conduct, and interpretation of food science research</td>
<td>FSN 564 (Chemistry of Food Systems)</td>
</tr>
<tr>
<td>ULO 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 3. Formulate solutions to practical problems in food safety, production, development, sustainability and aspects of consumer health</td>
<td>SLO 3. Integrate theoretical food science principles and statistical design and analysis principles on practical applications to address real-world issues</td>
<td>SS 501 (Research Planning)</td>
</tr>
<tr>
<td>ULO 5. Use their knowledge and skills to make a positive contribution to society</td>
<td>PLO 4. Communicate effectively and work effectively and ethically with individuals and groups</td>
<td>SLO 4. Assess the implications of sustainability in food science</td>
<td>FSN 575 (Advanced Food Safety)</td>
</tr>
<tr>
<td>ULO 7. Engage in lifelong learning</td>
<td>SLO 5. Effectively communicate discipline-specific information in written and oral forms to scientific and non-scientific audiences</td>
<td></td>
<td>FSN 581 (Seminar - Sustainability)</td>
</tr>
<tr>
<td>ULO 2. Communicate effectively</td>
<td>SLO 6. Exhibit leadership and ethical reasoning</td>
<td></td>
<td>FSN 599 (Thesis)</td>
</tr>
<tr>
<td>ULO 4. Work productively as individuals and in groups</td>
<td>Supporting coursework (16 units)</td>
<td></td>
<td>STAT 513 (Applied Experimental Design and Regression Models)</td>
</tr>
<tr>
<td>MS Food Science</td>
<td>Thesis Oral Defense</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cal Poly, San Luis Obispo</td>
<td>Written Thesis</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

D = development level; M = mastery level. Introductory level is not included for all learning outcomes because of prerequisite educational background for the MS program.
Mastery is defined here as the highest level of attainment in the master’s degree program.
Table 4.b.2 Comprehensive Assessment Plan MS Food Science

<table>
<thead>
<tr>
<th>Student Learning Outcomes (SLOs)</th>
<th>Program Learning Outcomes (PLOs)</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>SLO 1. Apply fundamental principles of food science in research and required coursework</td>
<td>PLO 1: Demonstrate technical competence in the discipline of food science</td>
<td>Rotation for FSN 564, FSN 575</td>
</tr>
<tr>
<td>SLO 2. Demonstrate independent and creative thinking skills in the formulation, design, conduct, and interpretation of food science research</td>
<td>PLO 2: Apply advanced critical thinking skills in the design, analysis, interpretation and communication of food science research</td>
<td></td>
</tr>
<tr>
<td>SLO 3. Integrate theoretical food science principles and statistical design and analysis principles on practical applications to address real-world issues.</td>
<td>PLO 3: Formulate solutions to practical problems in food production, development, sustainability and aspects of consumer health</td>
<td></td>
</tr>
<tr>
<td>SLO 4. Assess the implications of sustainability in food science</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SLO 5. Effectively communicate discipline-specific information in written and oral forms to scientific and non-scientific audiences.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SLO 6. Exhibit Leadership and Ethical Reasoning</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

FSN 564 Chemistry of Food Systems
FSN 575 Advanced Food Safety
FSN 599 Thesis
FSN 581 Graduate Seminar - Sustainability
FSN 505 Orientation to Graduate Research
FSN 564 Chemistry of Food Systems
FSN 599 Thesis

* Inter-reliability will be addressed by having the student work normed by entire food science faculty every other year starting year 2 by evaluating work of students for each student learning outcomes. When discrepancy more than 1 point apart will occur, alignment will be achieved through consensus during a meeting involving all food science faculty.
Who will collect, analyze the data? How will data be reported? By whom?
The Food Science faculty administering the courses will administrate the assessment, collect
the data and graduate coordinator will summarize and present the data. Entire faculty will
review the data and identify where improvement is needed. Assessment data will be reported
to Academic Programs and Planning office by Spring quarter each year. The university Academic
Assessment Council will review the reports during the summer to provide feedback on
assessment activities and data. Feedback will be folded into improving assessment plans for the
following year.

c) Indicate total number of units required for graduation

45 quarter units

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

(Not applicable)

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

(Not applicable)

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

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

<table>
<thead>
<tr>
<th>Catalog number (number of units)</th>
<th>Course title</th>
<th>Units</th>
<th>G or UG</th>
<th>Prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>FSN 599 (9)</td>
<td>Thesis</td>
<td>1-9 (9 total required)</td>
<td>G</td>
<td>Graduate standing and consent of instructor</td>
</tr>
<tr>
<td>STAT 513 (4)*</td>
<td>Applied Experimental Design and Regression Models</td>
<td>4</td>
<td>G</td>
<td>Graduate standing and one of the following STAT 217, STAT 218, STAT 252, STAT 3 12, STAT 511, or STAT 542.</td>
</tr>
<tr>
<td>SS 501 (4)</td>
<td>Research Planning</td>
<td>4</td>
<td>G</td>
<td>Graduate standing and consent of instructor</td>
</tr>
<tr>
<td>FSN 505 (1)</td>
<td>Orientation to Food Science and Nutrition research</td>
<td>1</td>
<td>G</td>
<td>Graduate standing and consent of instructor</td>
</tr>
<tr>
<td>FSN 564 (4)</td>
<td>Chemistry of Food Systems</td>
<td>4</td>
<td>G</td>
<td>FSN 364 or graduate standing</td>
</tr>
<tr>
<td>FSN 575 (4)*</td>
<td>Advanced Food Safety</td>
<td>4</td>
<td>G</td>
<td>FSN 375 and MCR0 421, or graduate standing</td>
</tr>
<tr>
<td>FSN 581 (3)</td>
<td>Research Seminar</td>
<td>3</td>
<td>G</td>
<td>Graduate standing and consent of instructor</td>
</tr>
</tbody>
</table>

Total required course units 29

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

The required 29 units at a 500-level already fulfill the minimum 60% of graduate level courses for the MS Food Science (64.45%). There will be an additional 16 advisor approved units for the MS Food Science, and these course selections will be dependent on students’ research project and background. They will be chosen according to thesis supervisor and committee recommendations, along with the graduate coordinator. One-on-one advising with the thesis supervisor will ensure appropriate alignment of student objectives with course requirements and prerequisite requirements. Most instructors of 400- and 500-level courses have historically been open to admitting graduate students on a case-by-case basis depending on background, using the “consent of instructor” criterion. Other selections of advisor approved electives may include any 400- or 500-level courses that complement the thesis research and student interest, are appropriate based on student undergraduate background and training, and are approved by the thesis committee. Students may select from any of these electives, and will have the option to select some courses from the list provided below which have been summarized according to areas of emphasis that the student might be working on.
The field of Food Science is rather broad and involves several areas of emphasis including but not limited to Microbiology/Safety; Sensory/Product Development; Sustainability; Food Chemistry; and Meat Science/Dairy Science. Each has been identified as an area of academic and professional need and growth within the broader scope of food sciences and Cal Poly has faculty with expertise in each area (see section 7). Depending on the career the MS candidate is interested in, the student will have the choice to select advisor approved elective courses. There is no one-size-fits-all 45-unit program that would be beneficial for all of our MS Food Science students. The advisor approved electives are important for the student to be successful in their specific research, and the best options depend on the research project that they are going to focus on. Students joining the program will have a variety of background and interests as the MS Food Science program welcomes students from various undergraduate programs.

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

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

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

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

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

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

<table>
<thead>
<tr>
<th>Catalog number</th>
<th>Course title</th>
<th>Units</th>
<th>Req’d course?</th>
<th>G or UG</th>
<th>Prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>FSN 599</td>
<td>Thesis</td>
<td>1-9 (9 total required)</td>
<td>Y</td>
<td>G</td>
<td>Graduate standing and consent of instructor</td>
</tr>
<tr>
<td>STAT 513</td>
<td>Applied Experimental Design and Regression Models</td>
<td>4</td>
<td>Y</td>
<td>G</td>
<td>Graduate standing and one of the following: STAT 217, STAT 218, STAT 252, STAT 312, STAT 511, or STAT 542.</td>
</tr>
<tr>
<td>SS 501</td>
<td>Research Planning</td>
<td>4</td>
<td>Y</td>
<td>G</td>
<td>Graduate standing and consent of instructor</td>
</tr>
<tr>
<td>FSN 505</td>
<td>Orientation to Graduate Research</td>
<td>1</td>
<td>Y</td>
<td>G</td>
<td>Graduate standing and consent of instructor</td>
</tr>
<tr>
<td>FSN 564</td>
<td>Chemistry of Food Systems</td>
<td>4</td>
<td>Y</td>
<td>G</td>
<td>FSN 364 or graduate standing</td>
</tr>
<tr>
<td>FSN 575</td>
<td>Advanced Food Safety</td>
<td>4</td>
<td>Y</td>
<td>G</td>
<td>FSN 375 and MCRO 421, or graduate standing</td>
</tr>
<tr>
<td>FSN 581</td>
<td>Research Seminar</td>
<td>3</td>
<td>Y</td>
<td>G</td>
<td>Graduate standing or consent of instructor</td>
</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>29 required units</strong></td>
</tr>
<tr>
<td>FSN 490</td>
<td>Food Safety Modernization Act: Human Food</td>
<td>2</td>
<td>N</td>
<td>G</td>
<td>FSN 375 Food Safety (4 credits. Prerequisite FSN 370 (Food Plant Sanitation)), or graduate standing</td>
</tr>
<tr>
<td>FSN 491</td>
<td>Food Safety Modernization Act: Produce</td>
<td>2</td>
<td>N</td>
<td>G</td>
<td>FSN 375 Food Safety (4 credits. Prerequisite FSN 370 (Food Plant Sanitation)), or graduate standing</td>
</tr>
<tr>
<td>MCRO 424</td>
<td>Microbial Physiology</td>
<td>5</td>
<td>N</td>
<td>UG</td>
<td>MCRO 225 and CHEM 313 or CHEM 371 or graduate standing in biological sciences</td>
</tr>
<tr>
<td>MCRO 433</td>
<td>Microbial Biotechnology</td>
<td>3</td>
<td>N</td>
<td>UG</td>
<td>MCRO 221 or MCRO 224 and BIO 303 or BIO 351 and CHEM 216, CHEM 312 or CHEM 316 or graduate standing in biological sciences</td>
</tr>
<tr>
<td>MCRO 436</td>
<td>Environmental Microbiology</td>
<td>4</td>
<td>N</td>
<td>UG</td>
<td>BIO 160; BIO 161; BIO 263; and MCRO 221 or MCRO 224 or graduate standing in biological sciences</td>
</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>16 elective units</strong></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>45 units</strong></td>
</tr>
</tbody>
</table>
g) List any new courses that are: (1) needed to initiate the program or (2) needed during the first two years after implementation. Include proposed catalog descriptions for new courses. For graduate program proposals, identify whether each course is a graduate or undergraduate offering.

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

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

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

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

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

<table>
<thead>
<tr>
<th>Required Course</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Fall</td>
<td>Winter</td>
<td>Spring</td>
</tr>
<tr>
<td>FSN 505 Proposed instructor</td>
<td>X Jung</td>
<td></td>
<td>X Jung</td>
</tr>
<tr>
<td>FSN 564 Proposed instructor</td>
<td>X Ubbink</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FSN 575 Proposed instructor</td>
<td></td>
<td>X Lathrop</td>
<td></td>
</tr>
<tr>
<td>FSN 581 Proposed instructor</td>
<td></td>
<td>X Jung</td>
<td></td>
</tr>
<tr>
<td>FSN 599 Various faculty</td>
<td>X FS faculty</td>
<td>X FS faculty</td>
<td>X FS faculty</td>
</tr>
<tr>
<td>STAT 513</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>SS 501</td>
<td>X</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

i) For master's degree proposals, include evidence that program requirements conform to the minimum requirements for the culminating experience, as specified in Section 40510 of Title 5 of the California Code of Regulations.
Per Section 40510 of Title 5 of the California Code of Regulations, satisfactory completion of a thesis (the culminating experience) will be defined as follows:

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

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

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

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

<table>
<thead>
<tr>
<th>Cal Poly BS Program</th>
<th>Estimated number of applicants per year</th>
</tr>
</thead>
<tbody>
<tr>
<td>BS Biochemistry</td>
<td>0-1</td>
</tr>
<tr>
<td>BS Biological Sciences</td>
<td>0-1</td>
</tr>
<tr>
<td>BS Chemistry</td>
<td>1-2</td>
</tr>
<tr>
<td>BS Food Science</td>
<td>4-5</td>
</tr>
<tr>
<td>BS Animal Science</td>
<td>0-1</td>
</tr>
<tr>
<td>BS Dairy Science</td>
<td>0-1</td>
</tr>
<tr>
<td>BS General Engineering</td>
<td>0-1</td>
</tr>
<tr>
<td>BS Industrial Technology and Packaging</td>
<td>0-1</td>
</tr>
<tr>
<td>BS Microbiology</td>
<td>1-2</td>
</tr>
<tr>
<td>BS Nutrition</td>
<td>1-2</td>
</tr>
</tbody>
</table>
k) Admission criteria, including prerequisite coursework.

See section 3.b.

l) Criteria for student continuation in the program.

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

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

(Not applicable)

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

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

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

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

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

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

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

<table>
<thead>
<tr>
<th>Required Course</th>
<th>Fall Y1</th>
<th>Winter Y1</th>
<th>Spring Y1</th>
<th>Fall Y2</th>
<th>Winter Y2</th>
<th>Spring Y2</th>
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<tbody>
<tr>
<td>FSN 505</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FSN 564</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FSN 575</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FSN 581</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>FSN 599</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>STAT 513</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>SS 501</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>

Two example course plans, dependent on what year the student begins the program, are shown on the following page (Table 4.n.2). Note that the plans show explicitly the coursework required for the degree, while selections specific to the student and thesis research (and agreed upon by the thesis committee) are indicated as “approved electives.”
Table 4.n.2. Two examples of the two-year curriculum “roadmap” with required coursework shown in bold.

<table>
<thead>
<tr>
<th>Quarter</th>
<th>Course number/name</th>
<th>Units</th>
<th>Course number/name</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>FSN 505 Orientation to Graduate Research</td>
<td>1</td>
<td>FSN 505 Orientation to Graduate Research</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>FSN 564 Chemistry of Food System</td>
<td>4</td>
<td>FSN 599 Thesis¹</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>FSN 599 Thesis¹</td>
<td>1</td>
<td>Approved Elective(s)¹</td>
<td>5-10</td>
</tr>
<tr>
<td></td>
<td>Approved Elective(s)¹</td>
<td>2-5</td>
<td>Approved Elective(s)¹</td>
<td></td>
</tr>
<tr>
<td>Winter</td>
<td>SS 501 Research Planning</td>
<td>4</td>
<td>SS 501 Research Planning</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>FSN 575 Advanced Food Safety</td>
<td>4</td>
<td>FSN 599 Thesis¹</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>FSN 599 Thesis¹</td>
<td>1</td>
<td>Approved Electives¹</td>
<td>3-10</td>
</tr>
<tr>
<td></td>
<td>Approved Electives¹</td>
<td>0-3</td>
<td>Approved Electives¹</td>
<td></td>
</tr>
<tr>
<td>Spring</td>
<td>STAT 513 Statistical Methods</td>
<td>4</td>
<td>STAT 513 Statistical Methods</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>FSN 599 Thesis¹</td>
<td>1</td>
<td>FSN 599 Thesis¹</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>FSN 581¹ Graduate Seminar in Food Science and Nutrition</td>
<td>3</td>
<td>Approved Electives¹</td>
<td>3-5</td>
</tr>
<tr>
<td></td>
<td>Approved Electives¹</td>
<td>0-3</td>
<td>Approved Electives¹</td>
<td></td>
</tr>
<tr>
<td>Fall</td>
<td>FSN 599 Thesis¹</td>
<td>2</td>
<td>FSN 564 Chemistry of Food System</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Approved Electives¹</td>
<td>6-10</td>
<td>FSN 599 Thesis¹</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Approved Electives¹</td>
<td>5-8</td>
</tr>
<tr>
<td>Winter</td>
<td>FSN 599 Thesis</td>
<td>2</td>
<td>FSN 575 Advanced Food Safety</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Approved Electives¹</td>
<td>6-10</td>
<td>FSN 599 Thesis¹</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Approved Electives¹</td>
<td>5-7</td>
</tr>
<tr>
<td>Spring</td>
<td>FSN 599 Thesis¹</td>
<td>2</td>
<td>FSN 581¹ Graduate Seminar in Food Science and Nutrition</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Approved Electives¹</td>
<td>6-8</td>
<td>FSN 599 Thesis¹</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Approved Electives¹</td>
<td>3-6</td>
</tr>
</tbody>
</table>

Total units 45
Total units 45

¹ A full-time graduate student is defined as one taking 8 or more units in a quarter. Normally students are not permitted to enroll in more than 24 units in any one quarter
² Total of 16 units must be from approved electives; quarterly units will vary by student

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

(Not applicable)

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

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

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

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

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

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

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

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

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

The most notable structural differences between the proposed program and CSU Pomona program listed above are 1) the requirement of a course on food safety for all the students, and 2) a component on food sustainability for all the students. The addition of these two components will graduate students with a strong food science background and an understanding of the importance of sustainability as they approach their career in food science.

UC Davis is the Food Science MS program that is the closest to our program but is 300 miles from Cal Poly and primarily focuses on preparation for entry into a PhD program. Cal Poly is at a geographical advantage given its distance from the major urban areas in Northern and Southern California. Moreover, Cal Poly may act as a successful precursor (or ‘feeder’) MS program for PhD programs throughout the nation.

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

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

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

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

Community participation will not be required during the planning process.

e) Applicable workforce demand projections and other relevant data.

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

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

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

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

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

References:

6. STUDENT DEMAND

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

Evidence of student demand is highlighted below, beginning with an analysis of Cal Poly data that indicate a strong interest in the current specialization model MS. Data from the College of Agriculture, Food & Environmental Sciences at Cal Poly indicate that the currently offered MS in
Agriculture with specialization in Food Science and Nutrition was in high demand between 2008-2016, as evidenced by a 6-50% selection rate (Table 6.a.1).

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

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

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

Fifty-eight individuals responded to the survey, and 41.2% (24 students/alumni) of those individuals were interested in obtaining a Food Science-related MS degree. Individuals that were not interested in a Food Science Master’s were nutrition students interested in pursuing nutrition related graduate studies (47.3% or 27 students/alumni) or individuals that felt that this question didn’t apply to them (11.3% or 7 students/alumni). Figure 6a1 indicates that 81.8% (20 out of 24) of the students and alumni interested in pursuing a Food Science-related Master’s degree prefer obtaining a standalone MS Food Science compared to the current MS specialization option. Table 6a2 indicates the reason for selection of MS Food Science as a degree title due to its specificity for prospective employers and personal career goals. The comments clearly illustrate the potential of an MS Food Science versus an MS Agriculture, with a specialization in Food Science. How the degree will be considered by future employers is of great concern among students considering going to graduate school. By offering an MS Food Science to our students, we address their concerns.
Figure 6.a.1. Cal Poly undergraduates and alumni interest in the existing MS specialization or the standalone MS Food Science.

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

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

Would prefer to stay strictly in the food science realm.

More specific to goals in future.

The title seems more appropriate rather than tacked on as an aside to agriculture.

I am planning on attending graduate school; however, was not considering Cal Poly because the program did not sound applicable to what I want to do. If it were to change, I would definitely consider it.

I would want employers to see “Food Science” first rather than “Agriculture.”

A MS in Food Science would be more specialized than an MS in Agriculture.

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

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

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

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

Because the proposed program is a thesis research-based MS program, issues of access for non-traditional students cannot be solved via a distance MS program approach, as students will need access to campus facilities for research project work. However, as it has been done over the years with some students in the MS Agriculture (Specialization in Food Science & Nutrition), we will accommodate, when possible, within the timeframe of grant funding, non-traditional students such as those in the workforce, who may take a longer path to completion of the MS.
c) For master's degree proposals, the number of declared undergraduate majors and the degree production over the preceding three years for the corresponding baccalaureate program, if there is one.

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

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

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

d) Professional uses of the proposed degree program.

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

- Governmental jobs
  - Local, state and federal opportunities
    - USDA
    - FDA
- Foodservice & Management
  - Schools
  - Hospitals
  - Other institutional entities
- Food Industry
  - Research Scientist
  - Product development
  - Sensory evaluation
  - Food analyst
  - Food microbiologist
  - Food processing plant manager
  - Nutrition labeling and regulatory affairs
  - Product claims validation and research
  - Food fermentation
  - Brewing and distilling
• Postsecondary Educators
  o Junior colleges
  o Lecturers at universities
• MS as preparation for PhD in a broad range of areas

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

This information is contained within the table below:

<table>
<thead>
<tr>
<th></th>
<th>Number of Students</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>At initiation</td>
</tr>
<tr>
<td>Number of Majors</td>
<td>4</td>
</tr>
<tr>
<td>Number of Graduates</td>
<td>0</td>
</tr>
</tbody>
</table>

7. EXISTING SUPPORT RESOURCES FOR THE PROPOSED DEGREE PROGRAM

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

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

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

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

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

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

Appendix 9 summarizes current FSN facilities and equipment located in building 24. In addition to facilities and equipment in FSN, students (depending on thesis committee membership and thesis research topic) may have access to other facilities and equipment across campus.

Appendix 9 also summarizes current facilities and equipment in the Dairy Products Technology Center of the Dairy Science Department and the Animal Science Department.

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

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

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

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

Please refer to Appendix 10 for this report.

8. ADDITIONAL SUPPORT RESOURCES REQUIRED

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

There will be no additional faculty or staff support positions needed to implement the proposed program, except replacement of faculty recently retired or lost.
b) The amount of additional lecture and/or laboratory space required to initiate and to sustain the program over the next five years. Indicate any additional special facilities that will be required. If the space is under construction, what is the projected occupancy date? If the space is planned, indicate campus-wide priority of the facility, capital outlay program priority, and projected date of occupancy.

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

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

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

Please refer to Appendix 10 for this report.

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

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

(2) Aside from the conventional technology upgrades, administration considerations, and similar small-scale requirements, there will be no additional academic technology, equipment, or specialized materials required to continue the proposed program after two years. These upgrades will be comprised of input from the department and the college. The increased number of graduate students in the department will offset these relatively minimal costs.
Date: April 25, 2018

To: Brian Self, Chair  
   Academic Senate Curriculum Committee

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

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

Re: New program: Master of Science in Food Science

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

This program will replace the current Master of Science in Agriculture with a specialization in Food Science (and Nutrition).
Date: April 11, 2018

To: Brian Self, Chair Academic Senate Curriculum Committee

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

From: Michael McCullough, Chair
      CAFES Curriculum Committee

Subject: Submission of 2019-21 Catalog Proposals

The CAFES Curriculum committee has finished reviewing the proposal for the new Master of Science in Food Science. The committee unanimously voted to approve the proposal on April 6, 2018. This memo serves as notification, so the Academic Senate curriculum committee may begin their review.
Dr. Stephanie Jung  
Graduate Coordinator  
Food Science and Nutrition Department  
California Polytechnic State University  

June 7, 2017  

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

Dr. Jung,  

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

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

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

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

Sincerely,  

[Signature]  

Jaymie Noland, DVM  
Department Head  
Animal Science  
California Polytechnic State University  
University  
1 Grand Ave,  
San Luis Obispo, CA 93407
Dr. Stephanie Jung
Graduate Coordinator
Food Science and Nutrition Department
California Polytechnic State University

18Apr17

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

Dr. Jung,

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

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

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

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

Respectfully yours,

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

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

CENTRAL COAST LEAN
Dear Colleague,

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

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

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

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

Yours respectfully,

Benoit Lecat, PhD
Wine and Viticulture Department Head- Cal Poly - San Luis Obispo
E-mail: blecatal@calpoly.edu
Phone: +1 (805) 756-2415
April 27, 2017

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

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

Dear Dr. Jung

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

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

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

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

Sincerely,

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

Greetings-

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

Brian Self

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

To: Dustin Stegner
   Chair, Academic Senate

From: Jeffrey D. Armstrong
       President

Date: July 2, 2018

Copies: K. Enz Finken
        M. Pederson
        A. Thulin
        R. Cavaletto
        J. Prince
        R. Savage
        J. Ubbink

Subject: Response to Academic Senate Resolution AS-853-18 - Resolution on Proposed New Degree Program: Master of Science in Food Science

I am pleased to approve the above-entitled Academic Senate resolution. The proposal will now be sent to the Chancellor's Office for approval.

Please express my appreciation to the Academic Senate members for their attention to this important curricular matter.