Adopted: May 5, 2015

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

AS-797-15

RESOLUTION ON PROPOSAL TO ESTABLISH A MASTER OF SCIENCE IN NUTRITION

WHEREAS, There is a demonstrated state and national-level need for individuals with advanced training in the nutrition sciences, and

WHEREAS, The existing Master of Science in Agriculture with Specialization in Food Science & Nutrition is in high demand but does not contain a nutrition-specific core of courses and the distinguished status of a stand-alone MS Nutrition, and

WHEREAS, The proposed Cal Poly Graduate Group in Nutrition was developed in partnership with and will create interdisciplinary collaborative opportunities for faculty and students across at least nine academic departments, and

WHEREAS, The Academic Senate Curriculum Committee has evaluated and recommended the program for approval, and

WHEREAS, A summary of the program is attached to this resolution with the full proposal available in the Academic Senate office, therefore be it

RESOLVED: That the proposal for the Master of Science in Nutrition be approved by the Academic Senate of Cal Poly.

Proposed by: The Food Science and Nutrition Department
Date: March 4, 2015

Cal Poly, SLO
Food Science & Nutrition Department

Summary statement of the proposed MS Nutrition degree for review by the Academic Senate

1. Title of the new program:

Master of Science in Nutrition

2. Program overview and rationale:

Purpose

This program is designed to produce graduates with advanced knowledge and skills in nutrition. Content knowledge will include training to develop student expertise in nutrition themes ranging from molecular nutrition to public health, a "cells to society" approach. The program will also prepare graduates for advancement, specialization, and leadership in nutrition or healthcare careers and further education in dietetic internships, professional schools, allied health professions, the food industry, or doctoral studies. Within the program, students will be able to select one of three suggested emphasis areas, which are Molecular Nutrition, Public Health Nutrition, or Health and Wellness.

Strengths

Three areas of emphasis will be offered to strategically align with demands in society and the job market. Program strengths include 1) the strategic alignment of the three 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 in human and animal nutrition that will provide the structure for the unique graduate group model. This model builds on the teacher-scholar model and emphasizes interdisciplinary collaboration from several academic units across campus.

Justification for Offering the Program at This Time

One of the key factors that make this proposal justified at this time is the economic burden of healthcare in the United States, which is unsustainable at national and individual levels. This will become increasingly salient as the population ages and periods of economic recession occur. As the focus on healthcare necessarily shifts to preventive care, both for cost and quality of life reasons, there will be increasing demand for nutritionists with advanced training. For example, Registered Dietitians increasingly need a Master of Science (MS) degree for special medical applications of nutrition science, students with MS degrees are more competitive for the dwindling number of competitive Accreditation Council for Education in Nutrition and Dietetics-approved Dietetic Internships nationwide; and by 2020, the entry level requirements for dietitians will include completion of a master's degree. Moreover, PhD programs will be seeking students with rigorous MS training in nutrition to enter a wide range of research environments in human

and animal nutrition. Graduates with master's level training in Nutrition who pursue additional advanced training in key academic areas including medicine and the clinical sciences, business, animal science, dairy science, or biology will be more competitive in today's global marketplace and interdisciplinary research environments. Cal Poly is well positioned to provide such graduates.

Summary

The proposed MS degree program will be strategically aligned with departments across campus, capitalizing on Cal Poly's many academic strengths and promoting a unique graduate with an integrated understanding of nutrition, from cells to society. To build alliances and promote collaboration, a "Graduate Group in Nutrition" will be facilitated by the Food Science and Nutrition (FSN) Department, which will serve as the academic home for the degree. Qualified faculty from FSN, Kinesiology, Animal Science, Dairy Science, the Social Sciences, and elsewhere on campus will be able to serve as thesis committee chairs and will be invited to work together on the governance of the MS program (for example, deciding on prerequisites for entry into the program; development of by-laws; refinement of thesis expectations; and so on). This approach stimulates interdisciplinary activity and encourages the use of shared resources and facilities for sustainability. It also stimulates the Cal Poly teacher-scholar model by improving faculty research profiles, generating external research funds, and building a strong graduate student body. Moreover, courses will more frequently be team-taught and cross-listed to ensure a broad range of participation from all academic units involved.

3. Anticipated student demand:

Evidence of student demand is highlighted below, beginning with an analysis of Cal Poly data that suggest 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 is in high demand. From 2008-2013 (**Table 1**), the existing MS in Ag with specialization was in high demand, as evidenced by a 6-38% selection rate. Students selected to the program tend to matriculate into the program (80% mean matriculation rate of those selected).

The expected number of majors in the year of initiation and three years and five years thereafter and the expected number of graduates in the year of initiation, three years, and five years thereafter is highlighted in **Table 2**.

Table 1. Data for the MS in Agriculture with specialization in Food Science and Nutrition from 2008-2012.

	Applicants	Selected	% Selected	Newly admitted	Yield
Fall 2008	14	4	28.6%	3	75.0%
Fall 2009	17	1	5.9%	1	100.0%
Fall 2010	16	6	37.5%	5	83.3%
Fall 2011	22	7	31.8%	3	42.9%
Fall 2012	27	4	14.8%	3	75.0%
Fall 2013	24	4	16.7%	4	100.0%

Table 2. Expected numbers of majors and graduates at three time points.

	Number of Students		
	At initiation	3 years after initiation	5 years after initiation
Number of Majors	8	10-15	15-20
Number of Graduates	0	8-10	20

4. Curriculum:

All degree requirements, including catalog number, course title, and number of units are shown in **Table 3** (all existing and approved courses). Course selections from existing courses taught at Cal Poly that would be appropriate choices for three suggested emphasis areas for the MS Nutrition degree are shown in **Table 4**.

Table 3. Required Courses (24 units)

Catalog number	Course title	Units
FSN 599[1]	Thesis	1-6 (6 total required)
STAT 512	Statistical Methods	4
FSN 516	Population Health and Epidemiology	3
FSN 528	Biochemical and Molecular Aspects of Human Macronutrient Metabolism	4
FSN 529	Metabolic and Molecular Aspects of Vitamins	2
FSN 530	Metabolic and Molecular Aspects of Minerals	2
FSN 581	Nutrition Research Seminar (to be taken 3 times during program)	1 (3 total required)
	Total required coursework	**24**
Supervisor-approved electives	Varies by emphasis area: Molecular Nutrition, Public Health Nutrition, or Health and Wellness.	21
	Total units needed for graduation	**45**

[1] *FSN 599 or XXX 599 depending on the thesis committee chair home department, the Thesis (599) units may have a different prefix (e.g., a student with a committee chair from Animal Science may sign up for ASCI 599).*

Table 4. Course selections from existing courses taught at Cal Poly that would be appropriate choices for three suggested emphasis areas for the MS Nutrition degree (21 units total required).

Course number	Course title	Units	Pre-requisites
Molecular Nutrition emphasis area			
ASCI 403	Applied Biotechnology in Animal Science	5	BIO 161, BIO 162, upper division genetics course (BIO 302 or BIO 303 or BIO 351 or ASCI 304) or consent of instructor
ASCI 420	Animal Metabolism and Nutrition	3	ASCI 220; ASCI 320 or CHEM 313 or CHEM 371.
ASCI 503	Advanced Molecular Techniques in Animal Science	4	ASCI 403 or equivalent course
BIO/CHEM 441	Bioinformatics Applications	4	Junior standing; BIO 161 or BIO 303. Recommended: BIO 302 or BIO 303 or BIO 351 or CHEM 373
BIO/CHEM 475	Molecular Biology	3	BIO 161, and grade of C- or better in BIO 351 or CHEM 373 or consent of instructor
BIO/CHEM 476	Gene Expression Laboratory	2	BIO/CHEM 475; CHEM 313 or CHEM 371, or graduate standing in Biological Sciences
BIO 501	Molecular and Cellular Biology	4	Graduate standing in Biological Sciences or consent of instructor
CHEM 474	Protein Techniques Laboratory	2	CHEM 371 or consent of instructor
CHEM 528	Nutritional Biochemistry	3	CHEM 313 or CHEM 372 or consent of instructor
KINE 454	Exercise Metabolism	3	KINE 303 and CHEM 312 and CHEM 313. Recommended: KINE 304
STAT 523	Design and Analysis of Experiments	4	STAT 513 or STAT 542
Public Health Nutrition emphasis area			
AGB 543	Agribusiness Policy and Program Analysis	4	Graduate standing or consent of instructor
AGB 554	Food System Marketing	4	Graduate standing or consent of instructor
BIO 542	Multivariate Biometry	4	Two courses in statistics or consent of instructor
FSN 480	Policy Arguments in Nutrition	2	Junior standing and consent of instructor
KINE 503	Current Health Issues	3	KINE 517, graduate standing, and consent of instructor
KINE 510	Health Behavior Change	3	KINE 250 or KINE 255 or KINE 260 and KINE 503 or KINE 504 and graduate standing
STAT 417	Survival Analysis Methods	4	STAT 302
STAT 419	Applied Multivariate Statistics	4	Two courses in statistics.

			Recommended: MATH 206
STAT 421	Survey Sampling and Methodology	4	One of the following: STAT 252, STAT 302, STAT 313, STAT 512, or STAT 513
STAT 524	Applied Regression Analysis	4	STAT 513 or STAT 542
STAT 530	Statistical Computing I: SAS	4	STAT 512 or STAT 513 or STAT 542 or equivalent

Health and Wellness emphasis area			
COMS 418	Health Communication	4	Completion of GE Area A and junior standing
KINE 408	Exercise and Health Gerontology	4	KINE 250, KINE 255 or KINE 260; and KINE 227, KINE 228, KINE 231 (formerly KINE 220) or KINE 311 (formerly KINE 219)
KINE 434	Health Promotion Program Planning	4	KINE 250 or KINE 255 or KINE 260, KINE 265, and junior standing
KINE 450	Worksite Health Promotion Programs	3	KINE 250 or KINE 255 or KINE 260, and senior standing
KINE 503	Current Health Issues	3	KINE 250 or KINE 255 or KINE 260 and graduate standing
KINE 504	Advanced Pathophysiology and Exercise	3	KINE 303 or equivalent, and graduate standing
KINE 510	Health Behavior Change	3	KINE 250 or KINE 255 or KINE 260 and KINE 503 or KINE 504 and graduate standing
KINE 522	Advanced Biomechanics	4	KINE 302 or equivalent
KINE 525	Advanced Motor Learning and Control	3	KINE 402 or equivalent
KINE 526	Sport and Exercise Psychology	3	Graduate standing
KINE 530	Advanced Physiology of Exercise	4	KINE 303 and graduate standing
KINE 534	Advanced Health Promotion Program Planning	4	KINE 503 or KINE 504 or KINE 510; graduate standing
PSY 465	Cross-Cultural Issues in Psychology	4	PSY 201 or PSY 202 and junior standing
Applicable to all emphasis areas			
FSN 420	Critical Evaluation of Nutrition Research	4	STAT 218; and senior standing. Corequisite: FSN 329
FSN* 500	Individual Study	1-6	Graduate standing, consent of supervising faculty member and graduate advisor
STAT 513	Applied Experimental Design/Regression Models	4	Graduate standing and one of the following: STAT 512, STAT 542, STAT 217, STAT 218, STAT 252, STAT 312, or equivalent
Or other electives approved by the GGN Executive Committee			

5. Student Learning Outcomes:

Graduates of the MS Nutrition program will achieve the following

1) Apply fundamental principles of nutrition science in research and required coursework
2) Explain, analyze, and interpret fundamental scientific concepts in the specific area of thesis research
    a. Suggested technical emphasis areas are: Molecular Nutrition, Public Health Nutrition, and Health and Wellness
3) Apply the scientific method to nutrition research through the design, conduct, and defense of a thesis research project
4) Apply critical thinking skills to the analysis of published research literature and the design/interpretation of a thesis research project
5) Show independent and creative thinking skills in the formulation, design, conduct, and interpretation of nutrition research
6) Demonstrate strong written and oral communication skills
7) Work productively, respectfully, and professionally as part of a research team and in other group settings
8) Exhibit leadership, ethical conduct, and community values

6. Workforce demand:

One of the key recommendations from the Accreditation Council for Education in Nutrition and Dietetics (ACEND), the accrediting agency for Academy of Nutrition and Dietetics (AND), dated February 2015 and entitled Rationale for Future Education Preparation of Nutrition and Dietetics Practitioners is "Master's level preparation for entry level, generalist, registered dietitian nutritionists." Specifically, by 2020, students wishing to become Registered Dietitians will be required to complete six years of study including advanced preparation such as that in a master's degree. Therefore, the demand for Nutrition master's degree programs will grow rapidly to meet this new requirement.

The Bureau of Labor Statistics (BLS) estimates that jobs for human and animal health professions including nutrition will increase faster than average, including a 9% increase in the employment of Registered Dietitians and Dietetics Practitioners. Further, BLS estimated that from 2010 to 2020, there would be a 20% increase in the employment of Registered Dietitians and Nutritionists, which is a faster growth than the average for all occupations. Results from the American Dietetic Association (AND) Integral Survey, a critical assessment of the future of the profession, revealed that Dietitians in particular are concerned that they may not have the skills or education to manage new challenges. Some of the new challenges include the aging population, the growth of obesity and diversity and even shifting educational needs for the dietetics profession.

The BLS also estimated that employment of health educators is expected to grow by 37% from 2010-2020, which is much faster than the average. The BLS further reported that jobs for animal nutrition scientists are expected to grow by 13% from 2008-2018, faster than the average, as concerns including food safety and

sustainability are being increasingly emphasized in the public and private sectors in the context of integrated animal-human health. All these professions could draw from graduates from the proposed MS degree.

The American Society for Nutrition recently outlined six priority research areas: 1) variability in individual responses to diet and foods; 2) healthy growth, development, and reproduction; 3) health maintenance; 4) medical management; 5) nutrition-related behaviors; and 6) food supply/environment. They also noted that "the multidisciplinary nature of nutrition research requires collaboration among research scientists with differing areas of expertise, many different stakeholders, and multifaceted approaches to develop the knowledge base required for establishing the evidence-based nutrition guidance and policies that will lead to better health and well-being of world populations". A graduate program employing the multidisciplinary graduate group approach will be best poised to meet this challenge.

6. Professional uses of the proposed degree program:

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

- Public Health/Community Nutrition/Government Jobs
    - Women, Infants and Children (WIC) Dietitian
    - Health Educator
    - Epidemiologist
    - Local, state and federal opportunities
        - Nutrition legislation
        - Nutrition programming and evaluation
- Research Scientist
- Clinical Nutrition
    - Managers
    - Specialist
- Foodservice & Management
    - Schools
    - Hospitals
- Animal Nutritionist
- Food Industry
    - Nutrition labeling and regulatory affairs
    - Product claims validation and research
    - Product development
    - Dietary supplements
- Postsecondary Educators
    - Junior Colleges
    - Lecturers at Universities
- MS as preparation for PhD in a broad range of areas
- MS as preparation for clinical science field
    - Human: Medicine, nursing, allied health professions including physical and occupational therapy
    - Animal: Veterinary science and associated clinical settings

RECEIVED
JUN - 1 2015
ACADEMIC SENATE

State of California
Memorandum

CAL POLY
SAN LUIS OBISPO

To: Gary Laver
Chair, Academic Senate

Date: May 21, 2015

From: Jeffrey D. Armstrong
President

Copies: K. Enz Finken
M. Pedersen
A. Thulin
M. Shelton
R. Cavaletto

Subject: Response to Academic Senate Resolution AS-797-15
Resolution on Proposal to Establish a Master of Science in Nutrition

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.