Proposal for an Intercollege PhD program in Nutrition

Locus. College of Tropical Agriculture and Human Resources

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Program Category. New, Intercollege (CTAHR-JABSOM-CRCH)

Department/Program. Department of Human Nutrition, Food and Animal Sciences (Home Department)

Degree Proposed. PhD in Nutrition

Proposed Date of Implementation. Fall Semester, 2007

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Program Objectives

The objective of the PhD program is to produce future leaders in the field of nutrition - leaders that can identify, research, and solve problems related to food, nutrition, and human health - especially in Hawaii and the Asia-Pacific region. Nutrition-related health problems are increasing in epidemic proportions in Hawaii, the Pacific Islands, and in developing regions of Asia. Obesity, heart disease, diabetes and the metabolic syndrome are common examples. To address these problems, we propose to integrate resources from the instructional and research programs housed in the College of Tropical Agriculture and Human Resources (CTAHR), the John A. Burns School of Medicine (JABSOM), and the Cancer Research Center of Hawaii (CRCH) to create a PhD program that will produce highly marketable, interdisciplinary graduates that can assume leadership roles in research, academic, government, medical and health-related enterprises.

This intercollege, collaborative PhD program will admit highly qualified students with a background in the biomedical sciences and a strong desire to be at the forefront of nutrition and biomedical research. Prospective students will include: 1) medical students from JABSOM seeking a MD/PhD and advanced biomedical or clinical research experience related to nutrition, 2) students seeking a PhD focused on nutritional epidemiology in coordination with JABSOM’s Public Health Sciences and Epidemiology program, 3) students focusing on aspects of diet and cancer (including obesity) in coordination with the CRCH, as well as doctoral students focusing on basic and applied aspects in the nutritional sciences within CTAHR (nutritional biochemistry and metabolism, international nutrition, clinical nutrition and diet therapy, nutrition education, food and culture, etc). The program will also provide courses and enhanced research opportunities for post-doctoral students in the Cancer Research Center’s R25 Postdoctoral Training program and potentially serve as a PhD program option for future CRCH R25 pre-doctoral training programs.

The proposed PhD program will be designed to prepare graduates for leadership and innovation in the biomedical sciences by fostering their development as critical thinkers, team players, self-directed interdisciplinary scholars, communicators, educators and researchers in the field of nutrition. To this end, students will not only be trained in the fundamentals of nutrition, but also in the socio-cultural, environmental, genetic, and medical determinants of nutrition-related problems. They will understand the research process, the cross-disciplinary team approach, and how to communicate, educate, and apply research findings and nutrition information to diverse clientele. To accomplish these goals, the program will insure that graduates demonstrate:

1) comprehensive understanding of core nutrition knowledge
2) expertise in at least one overlapping biomedical specialization (e.g. biochemistry, cell and molecular biology, epidemiology, biostatistics, physiology, medicine)
3) appropriate abilities with social and career-building skills (e.g. education, communications, ethics, information technology, technical writing, behavioral sciences)
4) a working, in-depth understanding of research methodologies, grantsmanship, and the publication and dissemination of research findings in professional and practical applications.

These program goals will be accomplished through the collective expertise of the graduate faculty in CTAHR, JABSOM and the CRCH, as well as the University community as a whole. Qualified graduate faculty from these units will be organized into a Nutrition Graduate Faculty led by a graduate program chair nominated by the Chairman of the Department of Human Nutrition, Food and Animal Sciences (HNFAS) and approved by the Dean of the Graduate Division. The Graduate Faculty will be responsible for maintaining the quality of admission requirements, curricular and program requirements, candidacy and comprehensive exams, and dissertation research that is original, independent, and a significant contribution to the field.
Program Justification

An intercollege, collaborative, PhD program in Nutrition would create a new, highly marketable degree program in Hawaii that would fill an academic gap at UH as well as enhance the interdisciplinary biomedical research potential of the University (especially within CTAHR, JABSOM, CRCH, and the new Kaka‘ako Research Park). There has never been a PhD program in nutrition at UH despite the fact that nutrition is a significant factor in all the major chronic diseases (cancer, heart disease, diabetes, obesity, hypertension, etc.). These diet-related health problems require the in-depth study and research afforded only by a PhD program. Considerable research funding from the NIH, NCI, and USDA is focused on understanding the relationship of diet and food components to human health. The enhanced depth and quality of students offered by a PhD program would assist UH researchers in competing for these funds. It is increasingly important for medical students, biomedical researchers and clinicians to have basic training in nutrition. This will enhance their potential to serve clients and also collaborate with nutrition faculty and doctoral students in the interdisciplinary types of biomedical research sought after by major granting agencies. Consumers are increasingly interested in, and knowledgeable about, the relationship of food and nutrients to disease processes. Medical students and clinicians need to become more educated in these areas to be competent physicians and educators. In turn, nutrition students can benefit from greater exposure to clinical practitioners and biomedical research opportunities available through interaction with students and faculty at JABSOM and CRCH. Furthermore, it is important for the food and agricultural disciplines within CTAHR to understand issues related to the health effects of food products and agricultural practices. This proposed intercollege PhD will help develop an interdisciplinary, team-approach philosophy to problem solving needed by professionals today by providing collaborations among students and faculty from CTAHR, JABSOM and the CRCH. Such diversity in student interactions can create a dynamic intellectual environment and improve the quality of research, research ideas, and information services to the public.

Since a PhD in Nutrition has never been offered at the University of Hawaii, residents of Hawaii, current medical students and health professionals in Hawaii and the Pacific Region, and prospective mainland students do not have the opportunity to obtain advanced training in nutrition in our state. These prospective students have no choice but to go elsewhere to study. Since there are very few Nutrition PhD programs in Asia, foreign students from the Asia-Pacific Region must also bypass UH and go elsewhere for training in this discipline. At least fifty of America’s leading universities offer a PhD in Nutrition graduating a total of 138 students annually. Most of the nation’s top medical schools offer a concentration in nutrition as part of their MD/PhD program. Hawaii is losing students to these mainland schools. We propose to fill this academic gap at UH and better serve the needs of the people of Hawaii and the Asia-Pacific region by providing an interdisciplinary PhD program that can address the unique tropical and ethnic characteristics of our region, and become highly marketable to students and their future employers.

Needs Assessment

To assess the need for a PhD in Nutrition at The University of Hawaii several types of information were obtained: the prevalence of PhD programs in nutrition at major universities in the US; the number of medical schools that contain a MD/PhD in nutrition option; the number of doctoral degrees in Nutritional Sciences awarded annually; solicited comments from prospective students; letters of support from administrators within JABSOM, CRCH, and CTAHR; and comments from prospective employers in the community about the need for a PhD in Nutrition.

Data from the latest published NSF survey indicate that over the period from 2000 – 2004 an average of 138 doctoral degrees in nutrition were awarded annually, an amount similar to many programs in the biological sciences and surpassing most disciplines in the agricultural sciences (Table 1, Appendix A). These numbers attest to the demand for training in this discipline and an academic gap in graduate program offerings at UH. According to a database search using GraduateSchools.com, at least fifty of America’s leading universities offer a PhD in nutrition. These universities include many on the west coast that compete with Hawaii for students such as Oregon State, University of Washington, UC Davis, UC Berkeley, Colorado State, and Utah State. Indeed, most major land-grant universities across the nation offer a doctoral degree in nutrition: Cornell, Wisconsin, Purdue, Ohio State, Penn State, Michigan State, Illinois, Rutgers, Virginia Tech, Florida, and Texas, to name only a few. The state of Hawaii is losing
students to these schools. For example, in the last ten years one fourth of the 32 students who graduated from CTAHR's current MS program in nutrition went on to pursue their PhD (8 PhD candidates in total); unfortunately, they all had to go elsewhere to do so (e.g. to Penn State, Emory, Rutgers, U. Washington, USC, and Colorado State). Furthermore, those MS graduates in nutrition who chose to remain in Hawaii for family reasons have not had the opportunity to continue doctoral training in their state. Letters from 4 of these prospective local students are included in Appendix B. It is reasonable to assume that the demand for a PhD program in Hawaii could easily result in the acceptance of 2-4 high-quality students per year.

In addition to filling an academic gap at UH, offering a PhD degree would include JABSOM among the major medical schools in the US that offer nutrition PhD programs. For example, Columbia University College of Physicians and Surgeons offers a PhD Program in Nutrition as part of their Coordinated Doctoral Program in the Basic Sciences. The University of Chicago Biomedical Sciences Program offers a graduate program in Human Nutrition and Nutritional Biology. Case Western Reserve University School of Medicine’s Biomedical Sciences Training Program offers a PhD in Nutritional Sciences. Emory School of Medicine offers an MD/PhD in Nutrition and Health Sciences, and both Johns Hopkins University and Harvard have doctoral programs in nutrition that are interdisciplinary with the Medical School and Schools of Public Health. We have an opportunity at UH not only to link nutrition with medicine, cancer research, and public health sciences, but also, because we are part of CTAHR, to link agriculture and food to consumer health issues in a tropical, multicultural population.

UH could also fill a gap in the availability of Nutrition PhD programs in Asia and the Pacific. According to GraduateSchools.com, Japan does not offer a PhD in Nutrition, nor does Thailand or the Philippines. Korea has five universities that offer a PhD, Australia has two, and Malaysia has one. China was not listed, but judging from experience with Chinese graduate students enrolled in our MS program, there are few nutrition PhD programs in China. Attendance at any major nutrition-related conference on the US mainland makes obvious the increasingly large number of Asian PhD students in the nutrition field. None are being trained at UH. We need to better serve our US affiliates and territorial nations in the Asia - Pacific region and begin to train PhD students from these regions. Asians are among America’s fastest growing and most productive minority groups.

Graduates from the proposed PhD program could also fill a need for trained nutrition professionals in the state, Pacific Islands, and Pacific Rim. Currently, the State Department of Health Nutrition Branch has no nutrition PhDs on staff. Neither do the state WIC (women, infants and children) and School Food and Nutrition Programs. Recently, UH hired a PhD from Johns Hopkins to head the Hawaii State Expanded Food and Nutrition Education Program (no qualified local applicants were available to apply). The University of Guam has only one faculty with a PhD in Nutrition (a former MS student at UH who had to go to the mainland for her PhD). The lack of nutrition PhDs in Guam is hindering the creation of a nutrition department there. There are currently no PhDs employed in any other Pacific Island academic institution, healthcare, or government agency despite a clear need given the nutrition-related health problems in the region. From this list of opportunities alone, at least 15 PhDs in nutrition could be employed in the state and Pacific Region, excluding nutrition faculty at UH.

Within the UH system and in the Pacific Rim, at least 30 PhDs could be employed in academic, research, healthcare and government agencies. These PhDs are needed at all levels of education, as nutrition policy makers, healthcare professionals, and researchers in hospitals, universities and research centers. Most of the Pacific Rim countries in Asia have few classically-trained nutrition PhDs (e.g. Indonesia, The Philippines, Southeast Asia, China, Japan) despite a growing consumer interest in nutrition and incidence of western-diet related health problems.

Appendix C contains letters from administrators at CTAHR, JABSOM, the CRCH, and the private sector commenting on the need for a PhD in Nutrition. In a poll of the members of the current Graduate Faculty in Nutritional Sciences, 80% indicated they were supportive of this proposal; the other 20% either abstained or had no comment. None were opposed.
Program Description

Interest in the relationship between diet and health has never been greater among consumers, medical professionals, government policy makers, research scientists, and a multitude of private industries related to food, agriculture, and healthcare. To serve these clients and improve the health of people in Hawaii and the Asia-Pacific region, the PhD program is designed to prepare future leaders who can expand our knowledge base about food and health, develop new approaches to solve nutrition-related problems, propose effective food and nutrition policies, guide new product and service development, and be effective communicators and educators. To ensure that graduates are prepared for these roles, students will be expected to demonstrate 1) a comprehensive understanding of core nutrition knowledge, 2) advanced scholarship in a specialty area with expertise in at least one overlapping biomedical discipline (e.g. biochemistry, physiology, cell and molecular biology, functional foods, epidemiology, biostatistics, medicine, psychology, etc), and 3) appropriate exposure to social and career-building disciplines (e.g. education, communications, information technology, technical writing, behavioral sciences). Students will also be expected to conduct original scholarly research, develop skills in research methodologies and grant writing, understand research ethics, and be able to dissemination research findings to others via peer-reviewed publications and practical applications. Specific admission and degree requirements are listed below.

Admissions. The admission process will be considered a critical step in insuring the success and quality of the program and its graduates and, therefore, applicants will be carefully evaluated and selected. The admissions committee will be chosen and led by the graduate chair and will be made up of the highest quality graduate faculty with proven records in mentoring successful graduate students. The admission criteria and procedures will conform to the Graduate Division’s standards for all Manoa doctorate programs. To insure consistent quality of training and financial support, the number of applicants admitted will be kept in line with the availability of high-quality dissertation advisors and available support (i.e. funding to support the student for 4-5 years). No student will be admitted by the admissions committee without a plan to support them and evidence of a good “fit” between the student’s needs and interests, and a graduate faculty member’s ability to serve as a dissertation advisor and mentor. It is anticipated that 2-4 doctoral students will be admitted into the program each year reaching a total enrollment of about 10-12 students when the program matures.

Applicants should have a BS or MS degree in nutrition or a closely related biological science; however, highly motivated students with other degrees may be considered if they have excellent academic backgrounds and demonstrated strength in the biological sciences. Students without adequate preparation in nutrition, biochemistry, physiology and statistics will be required to make up these prerequisites if admitted. The admissions committee will determine course deficiencies in an applicant’s background.

Additional admission requirements include a minimum grade point average of 3.4 out of 4.0 for BS students and 3.6 out of 4.0 for MS degree work, submission of GRE general test scores that demonstrate performance above the 50% percentile, three positive letters of recommendation, and a completed Graduate Admissions Application including a personal statement of objectives and resume. Foreign applicants must obtain a TOEFL score of 600 or above. Interviews (in person or by phone) will be required of all applicants deemed admissible by the admissions committee. In selecting applicants for admission, particular attention will be paid to the quality and depth of the personal statement, the strength of the letters of recommendation (i.e. they must indicate exceptional potential) and the professional qualities and academic depth presented in the personal interview.

Degree requirements. The principal requirements for the PhD degree are: 1) pass a qualifying examination for admission to candidacy, 2) complete required coursework, 3) pass a comprehensive exam to demonstrate advanced scholarship in the field, and 4) defend a doctoral dissertation that presents original, independent research. In addition, all PhD candidates will be required to participate in a substantial teaching project with a graduate faculty mentor during at least one semester of their program.

Qualifying exam. The purpose of the qualifying exam is to determine whether the student has the necessary background to proceed with a doctoral program and to enable advisors to assist the student in planning their program of study. The exam may be oral and/or written as decided by the examining committee. Students entering the program with a BS degree will be required to pass the qualifying exam.
within the first four semesters of their program. Candidates entering with a MS or MD degree must pass the exam within two semesters. Extensions can be made for students with course deficiencies to make up. MS graduates entering from the Nutritional Sciences MS program at UH are exempt from the exam, as suitability for the PhD program will be assessed during their MS program via the candidacy exam and thesis defense/final exam.

**Research proposal defense.** Students entering with a BS degree will be required to defend their research progress or dissertation research proposal to the satisfaction of their dissertation committee. They must do this after they pass their qualifying exam, but before they are permitted to take their comprehensive exam. This defense will serve as a capstone, similar to a MS thesis defense, and assure that the student can demonstrate sufficient research skills and knowledge of the research plan to proceed with the dissertation research.

**Required course work.** PhD students will be required to have at least 36 credits of graduate level coursework (excluding research credits) beyond their undergraduate degree, and 18 credits of coursework beyond their MS degree, as described below.

Students entering with a BS degree will be required to meet all requirements for the MS in Nutritional Sciences, excluding the production of a formal written thesis. The course requirements include the following 18 credits of graduate level coursework:

- 9 credits of required nutrition courses including 2 credits of seminar,
- 3 credits in statistics at the graduate level (e.g. PH 655 Biostatistics I)
- 6 credits of approved electives (3 of which must be at the 600-level)

In addition, at least 12 credits of directed reading and research (699) are required.

Students entering with a MS or MD degree will be required to make up any course deficiencies in their background prior to taking the qualifying exam. Course deficiencies will be assessed by the admissions committee.

The required coursework, research defense, and qualifying exam described above will assure that all students obtain sufficient core nutrition knowledge and introductory research skills to proceed toward the PhD degree. After the above requirements are met, all PhD students must take a minimum of 18 additional credits of course work consisting of at least: two graduate level courses in nutrition, 2 credits of seminar, and a minimum of 12 credits in courses that will foster the interdisciplinary development of their specialty area and career-building skills. To promote specialty and interdisciplinary skills, at least 6 credits of course work must be from fields overlapping with the discipline of nutrition (e.g. biochemistry, cell and molecular biology, epidemiology, medicine, biostatistics, functional foods, etc). Likewise, at least 6 credits are required from career-building disciplines (e.g. communications, education, information technology, technical writing, behavioral sciences). The student in consultation with his/her dissertation advisor will decide on the specific courses selected to meet these requirements. An example of a model course of study for a student entering the PhD program with a BS in Nutrition is shown in **Appendix D**. Examples of available overlapping interdisciplinary courses and career-building courses are given in **Appendix E**.

To foster teaching skills, all PhD candidates must also participate in a substantial teaching project during at least one semester of their program. All students who are not paid teaching assistants are required to develop, with a willing instructor of their choice, an instructional experience equivalent to a half time TA. At the conclusion of the experience their instructional mentor must submit a written evaluation of their performance to the graduate chair. Unsatisfactory evaluations will result in the need to repeat the experience until a favorable evaluation is achieved.

**Comprehensive exam.** When candidates have completed all, or most of their coursework toward the PhD, they must pass a comprehensive exam. The timing of the exam will be decided upon by the student in consultation with their advisor. The purpose of this exam is to determine the student’s comprehension of fundamental nutrition knowledge, expertise in an overlapping discipline, and competence in research, communications, and critical thinking skills to insure that they can excel as a professional in the field. The form of the exam is both written and oral. It will be conducted by an examination committee composed of at least three members of the graduate faculty (excluding the student’s advisor) with collective expertise to
cover the range of expectations listed above. The composition of the committee can be proposed by the student in consultation with their advisor. To insure the quality and consistency of exam committees, its composition must be approved by the graduate chair. The time frame and grading of the exam will be decided by the committee. The examination criteria and procedures will conform to the Graduate Division's standards for all Manoa doctorate programs.

A student must pass this exam to remain in the PhD program. The exam is repeatable once after successful petition to the graduate chair.

**Dissertation.** All PhD candidates must conduct scholarly, independent, original research that contributes new knowledge to the field. The candidates develop and conduct research projects under the direction of their dissertation advisor and committee. At the conclusion of the research, students write a dissertation, i.e. a scholarly presentation of their research in publication form. The student's dissertation committee then conducts a final examination to assess the student's ability to orally present their dissertation in a seminar format and defend their research and dissertation. The final exam is repeatable once after successful petition to the Graduate Dean. The final exam criteria and procedures will conform to the Graduate Division's standards for all Manoa doctorate programs.

**Program Administration**

The PhD in Nutrition will be an intercollege program housed within CTAHR in the Department of Human Nutrition, Food and Animal Sciences (HNFAS). The HNFAS department chair will nominate a graduate chair to be responsible for day-to-day leadership and administration of the program. The nominee will be selected from the full membership of the graduate faculty in Nutrition and be approved by both the graduate faculty, and the Dean of the Graduate Division. The graduate chair will head the Graduate Program Committee that will include at least one member from HNFAS, JABSOM and the CRCH. Committee members will be selected by their respective units. The Graduate Program Committee will have the responsibility to propose policy and facilitate program development. If needed, the committee may choose to add additional members drawn from the graduate faculty in nutrition. The Graduate Program Committee will seek input from, and poll the graduate faculty for approval of any major proposed changes in program policy or requirements. As with all graduate programs, overall administrative leadership will come from the Graduate Division.

**Relationship to Other Programs**

**JABSOM.** The Interim Dean of JABSOM has expressed his units support for the program (Appendix C). The faculty at JABSOM will contribute to the PhD program by: mentoring graduate students as dissertation chairpersons and committee members; contributing resources in the form of graduate research assistantships, laboratory and clinical research facilities; teaching appropriate courses; and contributing to the administrative leadership of the program. The availability of PhD and MD/PhD students to assist in nutrition-related clinical and basic research should improve research productivity and competitive grant awards at JABSOM. PhD students in the new program will also increase student enrollment in courses offered by JABSOM. These courses include clinical research methods and complementary medicine, basic science and biomedical courses, biostatistics, epidemiology, and graduate seminars. Having nutrition PhD students in these courses will increase the diversity in student interactions at JABSOM and foster a more dynamic intellectual environment. PhD students entering from outside the classical medical fields will also facilitate the interdisciplinary team outlook within JABSOM as students interact with faculty and seek out dissertation advisors and committee members within JABSOM. The proposed PhD program in Nutrition is being developed with full support of the chair of the PhD concentration in Epidemiology, as well as the chair of Public Health Sciences, so as not to compete with or duplicate these existing graduate programs in JABSOM.

**CRCH.** The Director of the CRCH has expressed his units support for the program (Appendix C). The faculty at the CRCH will contribute to the PhD program by: mentoring graduate students as dissertation chairpersons and committee members; contributing resources in the form of graduate research...
assistantships, laboratory and clinical research facilities; teaching appropriate courses; and contributing to
the administrative leadership of the program. A strong working relationship already exists between faculty
at the CRCH and the MS program in Nutritional Sciences. CRCH faculty contribute by co-teaching current
nutrition courses and have proposed a new 1 credit graduate course “Diet and Cancer” to include in the
new program. In addition, many MS students in Nutritional Sciences conduct their thesis research at the
CRCH mentored by graduate faculty involved with diet-related cancer research. PhD students entering the
new program with an interest in cancer research will further strengthen this working relationship with the
CRCH.

The Cancer Research Center has received funding for post-doctoral (R25) training programs. Classes and
seminars offered as part of the PhD in Nutrition will provide training opportunities for post-doctoral students
interested in diet and cancer. The CRCH does not have a graduate program and must rely on courses
provided by other programs at the Manoa campus. In the future, the CRCH may also want to extend the
R25 training program to include a pre-doctoral component. Such a program could be integrated into the
proposed PhD in Nutrition. Additionally, the CRCH has a NIH-NCI Minority Institution/Cancer Center
partnership grant with the University of Guam that runs from September 1, 2003 through August 31, 2008.
This grant program includes doctoral training for scientists from Guam. One of the active areas of research
is nutrition, but no program exists for this training even though funding is there for 2 students. Similar
programs are being considered with American Samoa and the Commonwealth of the Northern Marianas.

CTAHR. The new PhD program will be housed in CTAHR and will favorably impact CTAHR’s current
graduate programs and courses. It will bring additional students into graduate classes offered by the
college and strengthen its research potential and research collaborations with JABSOM and the CRCH.
The new PhD program will not compete with or duplicate any existing graduate program in CTAHR or
within the UH system.

Faculty in CTAHR will contribute to the PhD program by: mentoring graduate students as dissertation
chairpersons and committee members; contributing resources in the form of graduate research
assistantships, laboratory and animal research facilities; teaching courses; and providing administrative
leadership of the program via the Graduate Program Chair housed in HNFAS.

The current MS in Nutritional Sciences will also be favorably impacted. The MS program will form the basis
of the first two years of the PhD program as well as remain a terminal Master’s degree program. PhD
applicants admitted with a BS degree will meet all the requirements for a MS degree, except the thesis
requirement, prior to taking the PhD candidacy exam. Research during the period prior to candidacy can
be applied to the student’s dissertation research requirement. The main impact on the MS program will be
the additional PhD students who are in graduate courses and are conducting research projects. This will
strengthen the MS program.

Resources

Since the Department of Human Nutrition, Food and Animal Sciences currently offers and administers a
master’s degree in Nutritional Sciences, and has many graduate faculty capable of teaching, mentoring and
supporting nutrition PhD students and their research, no additional resources are needed to begin a PhD
program.

The HNFAS department recently consolidated the administration and graduate faculties of its three MS
programs (Food Science, Animal Sciences and Nutritional Sciences), increasing the efficiency of
administering these MS degree programs. Therefore, no additional administrative support staff or
resources should be required with the addition of a PhD program. Existing support staff working with the
Graduate Chair and graduate program committees can handle correspondence, admissions, and
administration of the PhD program.

Existing graduate faculty regularly teach all the nutrition courses required for the proposed PhD degree and
are proposing two new graduate nutrition courses (Diet and Cancer, and Obesity) that will add to the
classes already available. In addition, all the courses that support core nutrition knowledge as well as the
overlapping discipline courses and career-building courses that are required in the PhD curriculum are currently available on the Manoa campus (see Appendix E for examples of available courses). No additional FTEs are needed for the proposed curriculum.

Sufficient numbers of graduate faculty are available to chair PhD dissertation committees (see below for a list of current graduate faculty). Current graduate faculty in our MS program have appointments in Nutritional Sciences, Food Science, Animal Sciences, Molecular Biosciences and Bioengineering, the CRCH, Cell and Molecular Biology, Epidemiology, Physiology, Medical Technology, Kinesiology and Leisure Sciences, the State Department of Health, and Kaiser Permanente. These faculty members can provide sufficient research infrastructure, laboratory space, and graduate research assistantships for PhD students in Nutrition as they currently do now for PhD students in other biological sciences. The expectation is that, in the future, graduate faculty will draw increasing numbers of their PhD students from our program instead of other biological disciplines that are less oriented to biomedical and nutrition research.

The HNFAS department, and other departments within CTAHR, can provide teaching assistantships to PhD students as they do now for MS students in Nutritional Sciences. Our current MS option in Nutritional Sciences has 15 graduate students, 4 are supported by teaching assistantships, 3 by research assistantships, 1 by a private scholarship, and 5 by partial tuition waivers. It is expected that initially, the PhD program would not increase total student numbers, but rather shift the student pool away from MS students toward PhD students. Therefore, the current level of student support need not increase to maintain a PhD program containing up to 5 students.

It would be expected, however, that the availability of PhD level students would greatly increase their attractiveness as graduate research assistants for faculty with funded research programs. Many current faculty are reluctant to support MS students as research assistants due to their slower productivity, and instead hire PhD students from other programs or hire post-docs. With the potential for greater research productivity from PhD students, the number of research assistantships should increase to help support the target of 10-12 PhD students. For example, the director of Kaiser Permanente’s Center for Health Research Hawai‘i has expressed interest in providing research support for PhD students, but has in the past been unable to utilize MS students. Furthermore, as cooperation with JABSOM and the Cancer Research Center of Hawai‘i evolves, and the program evolves, new graduate faculty, assistantships, and instructional FTEs can be brought into the program to facilitate growth. Interdisciplinary proposals for PhD training grants and higher education challenge grants will become possible. The increased potential to develop these kinds of institutional grants as well as interdisciplinary research grants aimed at major funding agencies have the potential to add new resources to the program and the university.

Proposed Graduate Faculty for PhD Program in Nutrition (see Appendix F for CVs)

Program graduate faculty in the Department of Human Nutrition, Food and Animal Sciences:

J. Carpenter, PhD. (1976, Cornell University) - Protein and Fiber Utilization: cjim@hawaii.edu
P. A. Tschida, DrPH. (2004, Johns Hopkins) – Public Health/Community Nutrition, tschida@hawaii.edu
J. Dobbs, PhD. (1983, UC Davis) – Food Composition and Health Education: dobbz@hawaii.edu
D. Dooley, PhD. (1988, University of Wisconsin-Madison) - Diet and Behavior, Nutrition Education: dian@hawaii.edu
M.A. Dunn, PhD. (1985, Penn State University) - Nutritional biochemistry, Mineral metabolism, Aluminum toxicity: mdunn@hawaii.edu
C.Y. Hu, PhD. (1984, UC Davis) – Animal growth, adipose differentiation, lipid metabolism. hucy@ctahr.hawaii.edu
A.S. Huang, PhD. (1985, University of Wisconsin-Madison) - Food and Carbohydrate Chemistry, Taro Processing: ahuang@hawaii.edu
W.I. Iwaoka, PhD. (1972, Univ. Illinois) - Food Chemistry, Food Safety: iwaoka@hawaii.edu
Y.S. Kim, PhD (1988, UC Davis) – Muscle Biology, Regulation of growth and muscle mass: ykim@hawaii.edu

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Y. Li, PhD. (2004, Univ. Missouri) – Food microbiology, Food safety and probiotics. lijong@hawaii.edu

R. Novotny, RD, PhD. (1986, Cornell University) - Community and International Nutrition, Nutritional Epidemiology: novotny@hawaii.edu

C.A. Titchenal, PhD. (1986, UC Davis) - Sports Nutrition, Energy Balance: titch@hawaii.edu

J. Yang, PhD. (1999, Univ. of Alberta, Canada)- Molecular biology of growth, Animal Cloning: jinzeng@hawaii.edu

S. Zaghloul, PhD. (1992, Univ. Arizona)- Nutritional Epidemiology, Nutrition Education: zaghloul@hawaii.edu

Cooperating graduate faculty:

C.L. Albright, Ph.D (1983, Univ Houston), MPH (1986, UC Berkeley) Intervention research on energy balance/weight control; physical activity; dietary fat, fiber, and fruits/vegetables. Cancer Research Center of Hawaii: calbright@crch.hawaii.edu

M. J. Berry, PhD. (1986, UC Santa Barbara) - Selenoproteins; Antioxidants and human disease. JABSOM, Dept. of Cell and Molecular Biology: mberry@hawaii.edu

R. Cooney, PhD (1981, UC San Diego) - Tocopherols, carotenoids and Coenzyme Q-10 mechanisms of action in health and disease. Cancer Research Center of Hawaii: Bob@crch.hawaii.edu

A. Franke, PhD. (1985, Freiburg, Germany) - Analytical Chemistry, Lab Assessment, Phytochemicals; Cancer Research Center of Hawaii: adrian@crch.hawaii.edu

J. Grove, PhD (1969, University of Hawaii) – Biostatistics/Epidemiology; JABSOM/Public Health Sciences: jgrove@hawaii.edu

R. Hetzler, PhD. (1988, Southern Illinois) - Exercise Physiology, Sport Nutrition; Department of Kinesiology and Leisure Sciences: hetzler@hawaii.edu

L. N. Kolonel, MD, PhD (1968, Harvard, 1972, UC Berkeley)- Nutrition and Cancer, Cancer Epidemiology; Cancer Research Center of Hawaii: lkolonel@crch.hawaii.edu

J. Grove, PhD (1969, University of Hawaii) – Biostatistics/Epidemiology; JABSOM/Public Health Sciences: jgrove@hawaii.edu

Q.X. Li, PhD. (1990, UC Davis) - Environmental biochemistry, proteomics. CTAHR, Dept. of Molecular Biosciences and BioSystems Engineering. qingl@hawaii.edu

G. Maskarinec, MD, MPH, PhD. (1979, Albert Ludwigs-uni-Freiburg, Germany; 1989 and 1996, University of Hawaii) – Nutritional Epidemiology, Soy, Hormones and Cancer; Cancer Research Center of Hawaii: gertraud@crch.hawaii.edu

S. Sharma, PhD. (1996, Manchester University Medical School, England) – Nutritional Epidemiology; Cancer Research Center of Hawaii: gsharma@crch.hawaii.edu

A. Theriault, PhD. (1994, University of Windsor, Canada) - clinical biochemistry, lipid metabolism in heart disease and diabetes. JABSOM, Division of Medical Technology: andre@hawaii.edu

Affiliate Graduate Faculty:

J. Gittelsohn, PhD. (1989, U. Conn.) - Nutritional Anthropology, Johns Hopkins, Bloomberg School of Public Health: jgittel@jhsp.edu

D. Galanis, PhD. (1994, Cornell University) - Pacific Island Nutrition, Nutritional Epidemiology, Hawaii State Department of Health: dgalanis@mail.health.state.hi.us

T. Vogt, MD, MPH - Dietary Intervention Trials; Director, Kaiser Permanente Center for Health Research Hawaii: Tom.M.Vogt@kp.org

A. Tacon, PhD. (1978, University College, Cardiff, Wales, UK) - Aquaculture in Human Nutrition: agitacon@aol.com

H. Turner, PhD. (1998, Univ. of London, UK) - Cell Biology and Immunology, Associate Director of Research, Queens Medical Center, Honolulu: hturner@queens.org
Program Quality and Evaluation

The most important aspects determining the quality of a PhD program are the quality of its graduate faculty and their resources. It is evident from the proposed graduate faculty in Nutrition listed above that the potential for a quality program exists at the University of Hawaii.

Nearly all of the current graduate faculty from HNFAS obtained their PhD degrees from nutrition programs in the top 50% nationwide, many from those in the top 10% such as Cornell, UC Davis, Wisconsin-Madison, Penn State, and Illinois. These faculty know from experience what a quality PhD program in nutrition entails and can provide quality mentorship for students in the program. Many of these faculty are successfully supporting and training MS students in nutrition at the present time and have also trained post-doctoral research associates.

The CRCH faculty, in particular, have distinguished research careers with well-funded programs and a long history of training PhD students and post-doctoral students from the biological sciences. There is every reason to expect that their expertise and substantial resources can be successfully applied to nutrition students since nutrition is a major factor in cancer research.

As with the CRCH, faculty from JABSOM have a history of training PhD students and there is a growing number of faculty with basic research programs related to nutrition (e.g. Dr. Marla Berry has a strong research and training program in selenium, and Dr. Theriault has a research program in phytochemicals and lipid metabolism). As JABSOM incorporates more clinical research into its programs, a greater need for clinical nutrition PhD students will also emerge. The new research facilities at Kaka`ako will provide quality infrastructure to support all types of nutrition research in JABSOM and the CRCH.

The cooperating graduate faculty from other departments within CTAHR, such as Molecular Biosciences and Bioengineering, also have a history of training PhD students (since they already have successful PhD programs of their own). As faculty from these departments are involved in nutrition-related research and have well funded research programs (e.g. Dr. Pratibha Nerukar), they will provide quality dissertation leadership for PhD students that have backgrounds and interests in molecular nutrition.

In addition we have well-funded, high-quality researchers in our affiliate faculty at the Queens Medical Center (Dr. Helen Turner) and at the Kaiser Permanente Center for Health Research Hawaii (Dr. Tom Vogt). The quality of the overall graduate faculty and their resources can be seen in their CVs found in Appendix F.

Evaluation Benchmarks for Program Progress. The program will be expected to reach benchmarks of quality and productivity at the time of the provisional review that show it emerging in the upper half of nutrition PhD programs in the nation. The benchmarks are listed below. The data given represent an average from queries made of Graduate Chairs of six PhD programs in nutrition considered to be in the top 50% nationwide (Purdue, Wisconsin, Oregon State, Rutgers, Penn State, Florida).

Benchmarks:
1. Average number of PhD students graduated per year ----------------------------- 3
2. % of graduates accepted into post doc or other professional positions ------------- ≥ 70%
3. Average # of publications by PhD student based on their dissertation research. ----- 1.5
4. % of PhD students that are supported by faculty research grants ------------------ ≥ 75%
5. % of PhD students that are supported by teaching assistantships ------------------ ≥ 10%
6. Average number of presentations at national meetings during PhD program-------- 1.5
7. Quality of graduate faculty is ranked in top 50% of nutrition programs by NRC: Research-Doctorate Programs in the United States.
Student Assessment. The following steps will foster and assess the student’s progress:

Learning Outcomes. The learning objectives of the program are to have students demonstrate mastery of fundamental knowledge in nutrition as well as advanced scholarship in their specialty area. In addition, students will be able to communicate both orally and in writing at a high level of proficiency, conduct and interpret nutrition research, and function as a professional in the discipline of nutrition.

Publication of Learning Outcomes. The above learning objectives will be published in the program summary sent to all prospective students, on the program’s departmental website, and in the programs Guide For Graduate Students given to all prospective and admitted students.

Mapping Learning Outcomes into the Program. Fundamental knowledge in nutrition is mapped into the program by requiring prerequisite courses in basic nutrition and related disciplines in the students undergraduate and MS preparation, or that these prerequisite courses be taken early in the student’s program. An oral candidacy exam conducted by graduate faculty with expertise spanning all areas of nutrition is administered early in the student’s program and any deficiencies in fundamental knowledge uncovered in the exam are required to be remedied by additional coursework or other appropriate approaches like independent studies, teaching assistant duties, faculty mentoring, or internships.

Advanced scholarship is mapped into the program by requiring at least 11 credits of graduate level coursework in nutrition as well as 6 credits in interdisciplinary courses related to the student’s specialty area and 6 credits in career building skills. Scholarship in the student’s specialty area is mapped in by the chair of the student’s dissertation committee who guides the student in the selection of elective courses to shape that specialty area, as well as by mentoring the student in that area during the research and thesis writing processes. When candidates have completed all, or most of their coursework toward the PhD, they must pass a comprehensive oral and written exam. The purpose of this exam is to determine if the student can demonstrate advanced scholarship in nutrition, expertise in an overlapping discipline, and competence in communication and professionalism. A student must pass this exam to remain in the PhD program.

Oral communication skills are mapped in by requiring the students to take at least four nutrition seminar classes where they present a critical evaluation of a nutrition topic, by the oral candidacy and comprehensive exam questions, by requiring all students to act as a teaching assistant during at least one semester of their program, by requiring an oral presentation of their dissertation research at their final exam, and by presentations at national conferences. Written communication is mapped in by writing assignments and essay type exams in courses, a written proposal for the student’s research, written answers on qualifying and comprehensive exams, a written PhD dissertation required for the final exam, and by research articles submitted for publication.

Conducting nutrition research is mapped in by the requirement of a scholarly, independent, original dissertation research project conducted under the guidance of a research mentor (Chair of the dissertation committee) and a dissertation committee. Interpretation of research is mapped in by seminar courses requiring the oral presentation of a research paper or proposal, by proposal writing, by journal clubs, by the literature review required in the dissertation and in research articles submitted for publication.

The ability to function as a professional in the field is mapped in by the requirement of passing both a candidacy exam and comprehensive exam to demonstrate professional scholarship and communication skills, the requirement of at least one semester as a teaching assistant and four seminar presentations to demonstrate presentation and education skills, the production of an original, independent, scholarly dissertation, and the expectation to publish in peer-reviewed journals and present research findings at national conferences to demonstrate professional research skills.

Assessment events:

a) Candidacy Exam. Prior to the exam, the student’s advisor and the examination committee review the student’s academic progress. The purpose is to insure that the student has taken, or has plans to take, the proper required courses as well as any deficient prerequisites. In addition, timely progress on the student’s proposed research is also evaluated. The candidacy exam itself is used to evaluate if the student has a
mastery of fundamental knowledge in nutrition and related fields, and can express this knowledge in a professional manner. If any deficiencies in fundamental knowledge or communication skills are uncovered, then the examination committee recommends coursework, independent study, mentorship by a faculty member, seminar presentations, or other appropriate means to remedy the deficiency.

b) Required research defense. Students entering with BS degree will be required to orally defend their research progress or dissertation research proposal to the satisfaction of their dissertation committee. They must do this after they pass their candidacy exam, but before they are permitted to take their comprehensive exam. This will assure that the student can demonstrate sufficient research skills and knowledge of the research plan needed to proceed with the PhD dissertation.

b) Required Seminar Presentations. At least four seminar presentations focusing on research literature are required in the student’s program. These presentations are used to evaluate the student’s ability to interpret research literature and present literature reviews in a professional format (Powerpoint) using appropriate oral and visual communication skills. The presentations are used by the seminar instructor and the student’s advisor to evaluate the student’s proficiency and any needs for further development.

c) Required Teaching Assistant Experience. All students are required to assist a faculty member with instructional-related work for at least one semester during their program. The faculty member and the student agree on a set of instructional-related duties prior to the start of the semester. At the end of the semester, the instructor evaluates the student’s performance in writing with a copy forwarded to the graduate chair. If the evaluation is unfavorable, the experience must be repeated until a favorable evaluation is achieved. This teaching experience is used to evaluate the student’s ability to work in a professional educational context.

d) Comprehensive exam. When candidates have completed all, or most of their coursework toward the PhD, they must pass a comprehensive oral and written exam. The dissertation committee conducts the exam. The purpose of this exam is to determine the student’s comprehension of fundamental nutrition knowledge, expertise in an overlapping discipline, and competence in research, communications and critical thinking skills to insure that they can excel as a professional in the field. A student must pass this exam to remain in the PhD program.

e) Dissertation defense/final exam. This culminating experience evaluates the student’s ability to conduct and present original, independent, scholarly research in a professional manner. The final exam committee evaluates these abilities by reading the dissertation, listening to the oral presentation, and conducting an oral exam covering all aspects of the dissertation and presentation. If any aspect of the final exam is unsatisfactory, the student is asked to remedy the situation. This may involve rewriting, conducting more research, preparing a new presentation, or deepening their understanding of the research in order to demonstrate that they can function at the professional level as a researcher in the field.

Contributions to discipline:

a) Publications. All PhD students contribute to the discipline by publishing a dissertation. It is expected that all PhD graduates will publish at least one article in a peer-reviewed professional journal.

b) Presentations at professional conferences. It is expected that all PhD students present their research at a national or international research conference sponsored by professional research organizations in the field such as the American Society for Nutrition. Additional presentations will also be made at the CTAHR symposium and other University-based professional-style conferences.

Monitoring student post-graduate professional activities. A survey instrument has been developed (see below) to monitor post-graduate professional activities and obtain feedback on satisfaction with the PhD program.
Program Assessment. The program will be assessed using the benchmarks and assessment steps listed above, and the post-graduate survey instrument shown below:

University of Hawai‘i at Manoa
Survey of Graduates from the Nutrition PhD Program

The Graduate program in Nutritional Sciences is interested in your postgraduate activities since receiving your PhD degree. We would appreciate it greatly if you would complete the following survey and return it by e-mail. Responses to the survey will be treated as confidential and will be reported in summary form only. Thank you very much for your cooperation and participation. If you would like to see a summary of the results, please let us know.

SECTION I General Information

1. Name (under which you went to school): _____________________________________________ (Last, First, Middle Initial)  
   Address: ______________________________________________________________________  
   ______________________________________________________________________  
   Telephone: ___________________________ E-Mail: ________________________________

2. When did you begin your PhD program? ____________________________________________

3. What degree did you have when you entered our program? ____________________________

4. When did you graduate? __________________________________________________________

5. How many peer-reviewed articles did you publish based on your PhD work? ______________

6. How many presentations did you make at national conferences? _________________________

7. Indicate your major sources of financial support for your PhD (TA, RA, Scholarship, other)____________________________________________________________________________

SECTION II Current Employment Status. Please fill out this section completely.

8. Check the box(es) that fit(s) your current status. Check all that apply.
   □ a. Employed full-time (30 or more hours/week)
   □ b. Employed part-time (less than 30 hours/week)
   □ c. In post-doctoral studies full-time. Where? ________________________________.
   □ d. In graduate school. If checked, where? ________________________________.
   □ e. Accepted and will begin post doc. Where? ________________________________.
   □ f. Not working and seeking employment
   □ h. Not working and not seeking employment

9. What was your status during the year following graduation?
   □ a. Employed full-time (30 or more hours/week)
   □ b. Employed part-time (less than 30 hours/week)
   □ c. Continued in graduate school or post doctoral studies full-time
   □ d. Continued in graduate school or post graduate studies part-time
   □ e. Did not work but sought employment
   □ f. Did not work and did not seek employment
   □ h. (Please list main reason, e.g. travel, family time, etc.: __________________________)
SECTION III  Employment Details. Since graduating from UHM, if you have worked, currently are working or have accepted definite employment, complete this section.

10. Name of organization?

________________________________________________________________________

Organization Name  Location (City & State/Country)

11. Type of employer?

12. Which of the following best describes your employer?
   a. Nutrition Services (including dietetics)  e. Education
   b. Research  f. Professional school (medicine, pharmacy, veterinary medicine, etc)
   c. Consulting Service (primary service: _____________)  g. Animal Clinic
   d. Health Services  h. Other ________________

13. Your job title? __________________________________________

14. Is this your first job after graduation? a. Yes  b. No. If no, how many jobs have you had? ___

15. How long have you worked in your current job?
   a. Less than a year  b. 1 year  c. 2 years  d. 3 years  e. 4 years
   f. 5 years  g. 6 years or more

16. Please indicate the job search method(s) you used in your job search. Check all that apply.
   a. Applied directly to organization  f. Career Services (www.hawaii.edu/career)
   b. Referral by Professor/Advisor  g. Newspaper/Web classifieds
   c. Referral by Family and Friend  h. Government employment agency
   d. Networking on your own  i. Private employment agency
   e. Previous employer  j. Other (Specify: ______________________)

17. Of the job search methods you used, which did you find effective (i.e. led to interviews, job offers)? __________________________

18. We would appreciate it if you shared with us your current gross annual salary range.
   a. Under $20,000  d. $40,000-49,999  g. prefer not to answer
   b. $20,000-29,999  e. $50,000-59,999
   c. $30,000-39,999  f. over $60,000

19. How relevant is this job to your career goals?
   a. Relevant  b. Somewhat relevant  c. Not relevant at all

20. How helpful has your degree/major been in the duties of your current job?
   a. Helpful  b. Somewhat helpful  c. Not helpful at all

21. How helpful were your PhD student experiences in preparing you for your current job?
22. Indicate your satisfaction with the Nutritional Sciences PhD program.

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<thead>
<tr>
<th></th>
<th>Very Dissatisfied</th>
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<th>Neutral</th>
<th>Satisfied</th>
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<td>Academic advising</td>
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<td>Overall quality of instruction</td>
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<td>Quality of program in major/field</td>
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23. NON-SPECIFIC COMMENTS: What would you change in your graduate educational experience that will help us better prepare our future students?

24. If there were any courses, incidents, or individuals that made a difference for you or your career, we would appreciate if you shared this with us (Use back of sheet if necessary).
Narrative for cost estimate of proposed PhD Program in Nutrition

As discussed in the PhD proposal under “Resources” we feel we can offer a new PhD Program in Nutrition without additional general funds. Since the Department of Human Nutrition, Food and Animal Sciences (which will house the new program) currently offers and administers a MS degree in Nutritional Sciences, and has sufficient graduate faculty to teach and support nutrition PhD students and their research, no additional resources will be needed to add the PhD program to our existing MS program. The proposed new courses will be developed and taught by existing graduate faculty, and student funding will come primarily from teaching assistantships offered by the department and research assistantships from graduate faculty grants.

Explanation of Academic Program Cost and Revenues Template

Students and SSH
Headcount enrollment predictions for PhD students were based on our average fall MS admissions rate divided by 2 (equaling 2-3 PhD students per year). We plan to lower our MS student admissions by half and replace them with PhD students. Thus, total graduate student numbers should initially remain the same, but the composition will shift toward PhD students. I estimate that up to 15 of our graduate faculty can regularly support PhD students at any one time, so the maximum number of PhD students should plateau at about 10.

SSH were estimated based on students taking an average of 20 credit hours per year.

Direct and Incremental Program Costs
Salary costs were based on 5 full-time faculty teaching in the program with an average salary of $70,000. The 9% and 11% raises are included for years 1 and 2, respectively, and a 4% annual raise was used for all other years.

Other personnel costs are based on one full time APT position to assist the graduate chair with admissions and administrative duties. A 6% raise was included for years 2 and 3, 4% after that.

Revenue
Tuition was set at $286 per credit hour for 2008, increasing as projected to $458 by 2012. Other sources of revenue such as PhD training grants and infrastructure building grants will be sought, but cannot be included at this time.

Support Costs/SSH
Support costs were taken from the 2003-2004 UH expenditure report.
# Academic Program Cost and Revenues Template

## Ph.D. in Nutrition Proposal

### Academic Year (i.e., 2024-25)

<table>
<thead>
<tr>
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<tr>
<td>1. Students &amp; SSH</td>
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<td>3</td>
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<tr>
<td>2. Academic Program Cost and Revenues Template</td>
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### Program Costs

#### Instructional Costs with Fringe Benefits

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<td>3. Total Program Cost</td>
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### Instructional Costs without Fringe Benefits

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### Combined Program Costs

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### Supporting Services

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### Total Revenues

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<td>$15,350</td>
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## Conclusion

The Ph.D. in Nutrition program requires comprehensive preparation and support to ensure the success of its students and faculty. The detailed budget and revenue projections outlined above provide a clear understanding of the financial needs and the potential returns of this program. The program is designed to be cost-effective, ensuring that resources are allocated efficiently to support the academic and research activities of the program.