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The faculty, staff and students of the Department of Nutrition and Food Science (NFSC) are pleased to welcome you to Texas A&M University and trust that you will experience the culture that makes Aggieland unique. Texas A&M University is steeped in tradition, has a rich heritage of service and is the designated Land Grant University of Texas. As of Fall 2015, total student enrollment at Texas A&M University (College Station) was 59,110, an increase from 48,702 just 5 years ago. Undergraduate student enrollment for both Nutrition and Food Science majors totaled 685 students in 2015 (559 nutrition and 126 food science). Graduate enrollment is steadily increasing since our transition from an Interdisciplinary to the NFSC departmental Nutrition and Food Science program in 2012. We currently stand at 43 MS and 35 doctoral students and expect these numbers to significantly increase with the addition of 4 new faculty members at the beginning of 2016. Although our faculty numbers are relatively small with a total of 8 research faculty, those faculty obtained grants totaling $1.94 million and published 41 peer reviewed journal articles in 2015 and ranked among the top in our College in faculty productivity.

The department taught a total of 14,833 undergraduate student credit hours and 571 graduate student credit hours in 2015, awarding 143 B.S. Nutrition, 49 B.S. Food Science, 8 M.S. Nutrition, 4 M.S. Food Science, and 1 PhD in Food Science degrees in 2015. The percentage of undergraduate students below good academic standing is very low at 1.59% and 3.76% for Food Science and Nutrition, respectively compared to our College average of 6.24%. Our student population is also diverse and our trends show our diversity has increased from 7.1% of our students from under-represented minorities in 2010 to 14.5% in 2015 with over 77% female students.

The NFSC department has stayed true to its strategic plan to focus on two key areas of chronic diseases: cancer and obesity/diabetes. The successful recruiting of four new faculty members is an example of these strategic efforts and an indication of our College’s support. Our faculty continues to seek individual and joint grants and continues to integrate areas of nutrition and food science into our research and teaching. However, we are challenged by an appreciable lack of space, infrastructure, core equipment, adequate pilot facilities, and space for corporate development efforts in both disciplines. We will begin a building campaign in 2016 towards the financing and construction of a new Food and Nutrition Center. However, we have been successful in development efforts with the awarding of a $5 million endowment to develop an international program in Food Diversity to focus on ethnic and cultural diversity associated with food processing, ingredient sourcing, and product development. These funds were on top of $194,000 in additional gifts to the department in 2015.

We are pleased to have this opportunity to meet with a panel of food and nutrition experts to evaluate our undergraduate and graduate programs in both Nutrition and Food Science. We hope to gain valuable program insights through the eyes of a 3rd party to make our programs stronger, more competitive, and more productive for the sake of our students and the value of our academic reputation. Herein you will find our self-study that reflects a comprehensive review by our program leaders and an assessment of our academic programs and metrics in effort to identify our critical needs.
History of the University, College, and Nutrition and Food Science Department

The Texas A&M University System was officially established in 1948 and has evolved into one of the largest systems of higher education in the nation, with a statewide network of 11 universities, including our flagship, Texas A&M University, and ten regional universities across the state. Additionally, the A&M System provides service and education to the people of Texas and beyond through seven state agencies, two service units and a system administration office.

Each of the A&M System members has its own unique mission, history and goals. Together, they provide research, educational programs and community enhancement services that improve the lives of people in Texas and around the world. The A&M System members educate over 142,000 students and make more than 22 million additional educational contacts through service and outreach programs each year. With more than 24,000 faculty and staff, the A&M System has a physical presence in 250 of the state’s 254 counties and a programmatic presence in every county. The A&M System has real property holdings totaling more than 65,000 surface acres and 55,000 mineral acres.

Texas A&M University is a public institution dedicated to the development and dissemination of knowledge in diverse academic and professional fields. The University is committed to assist students in their search for knowledge to help them understand themselves, their cultural and physical environment, and to develop in them the wisdom and skills needed to assume responsibility in a democratic society. The University assumes as its historic trust the maintenance and enhancement of an intellectual environment that encourages the development and expansion of the human mind and spirit. While continuing to fulfill its mission as a Land-Grant/Sea-Grant/Space-Grant institution, the University is evolving and expanding its role to meet the changing needs of state, national, and international communities.

Established in 1876 as the first public college in the state, Texas A&M University today has become a world leader in teaching, research, and public service. Located in College Station in the heart of Texas, it is centrally situated among three of the country's 10 largest cities – Dallas, Houston, and San Antonio. It consistently ranks among the country's top 20 universities in enrollment of National Merit Scholars, with literally hundreds of these high-achieving students currently on campus. There are 10 diverse academic colleges at Texas A&M University.

Texas A&M University has rejoined the nation’s list of the top 20 research universities (#17), based on annual expenditures in research and development, according to a recent survey from the National Science Foundation (NSF). The NSF’s Higher Education Research and Development Survey ranks Texas A&M at 19th with research and development expenditures in excess of $854 million. Texas A&M AgriLife Research was ranked No. 1 in agricultural sciences expenditures for fiscal year 2013, the latest year for which figures are available, according to the National Science Foundation. The ranking marks the second year in a row the agency has topped almost 200 universities nationwide and accounted for more than $179 million of the more than $3.35 billion spent on agricultural research by more than 35 U.S. universities.
Aggie Traditions

Aggie Ring

One of the greatest moments in the life of every Aggie is the day that he or she receives an Aggie Ring. This tradition began with the Class of 1889. The original rings were very different from the one worn today because, at that time, several companies made different versions of the Aggie Ring. E.C. Jonas, Class of 1894, designed a ring that is similar to the ring worn today. There have been only slight changes to this design, including the name of the institution in 1964, from the Agricultural and Mechanical College of Texas to Texas A&M University. The Aggie Ring is rich in symbolism and tradition and is perhaps the most recognizable and enduring symbol of the Aggie Network. To learn more about the symbolism of the Aggie Ring go to www.AggieNetwork.com/ring. The highly cherished Aggie Ring can only be obtained through The Association of Former Students which has the distinct privilege of protecting the spirit and integrity of the Ring. Students must meet eligibility requirements including completion of at least 95 hours of coursework before they can order their Aggie Ring. Traditionally, students wear their ring with the class year facing them to signify that their time at A&M is not yet complete. At the annual Ring Dance, the student’s ring is turned around to face the world proudly, just as the Aggie graduate will be ready to face the world.

Bonfire

What began in 1907 as the casual custom of gathering junk and scrap wood for a bonfire, symbolizing the undying love all Aggies hold in their hearts for Texas A&M, eventually evolved into an exciting and eagerly anticipated tradition at Texas A&M. For nearly a century, Bonfire was lit just prior to the annual football game with the University of Texas (referred to as “t.u.” by Aggies), representing the burning desire Aggies have to “beat the hell out of t.u.!” Aggie Bonfire has been a testament to Aggie spirit and what Aggie leadership, teamwork and motivation can accomplish. Since the tragic fall of the stack on November 18, 1999 the Aggie Bonfire is now remembered in a memorial on campus dedicated to those who were lost and injured that day and throughout Bonfire’s history.

Silver Taps

By far, one of Texas A&M’s most honored traditions is Silver Taps. Silver Taps is held for a student who passes away while enrolled at A&M. This final tribute is held the first Tuesday of the month when a student has passed away the previous month. The first Silver Taps was held in 1898 and honored Lawrence Sullivan Ross, the former governor of Texas and president of A&M College. Silver Taps is currently held in the Academic Plaza. On the day of Silver Taps, a small card with the deceased students name, class, major, and date of birth is placed as a notice at the base of the academic flagpole. Around 10:15 that night, the lights are extinguished and hymns chime from Albritton Tower. Students silently gather at the statue of Lawrence Sullivan Ross. At 10:30pm, the Ross Volunteer Firing Squad marches into the plaza and fire a twenty-one gun salute. Buglers then play a special rendition of Silver Taps by Colonel Richard Dunn. Taps is played three times from the dome of the Academic Building: once to the north, south, and west. It is not played to the east because the sun will never rise on that Aggie again. After the buglers play, the students leave from Academic Plaza in complete silence.

Muster

Muster began in June of 1883 as members of the Ex-Cadets Association came together to “live over again
our college days, the victories and defeats won and lost upon drill ground and classroom” and to “let every alumni answer a roll call.” In 1922, April 21st became a formalized day of events for all A&M clubs to celebrate San Jacinto Day in the same fashion. Since then, events that occurred on April 21st have grown in size and number.

Muster gained national recognition in 1942 when newspapers reported that a Muster ceremony was held by 24 Aggies on the island of Corregidor in the Philippines just days before the land fell to the Japanese. Throughout World War II, there were reports of Aggies coming together from across the globe. Two men were said to have held Muster in a submarine. Accounts such as these inspired Aggies to establish annual Musters around the world and to inaugurate the first campus Muster ceremony in 1944. Today Aggie Muster is celebrated in more than 400 places worldwide. The ceremony brings together more Aggies and friends of Aggies on one occasion than any other at any other university in the world. Students coordinate the Campus Muster that is held for students, faculty and Former Students of the Brazos Valley. Each year Muster is dedicated to the fifty-year reunion class. The Campus Muster involves a day of activities for students of past and present. Former Students enjoy a special program including personalized tours of the ever-changing but historic campus. At noon, all Aggies converge at the Academic Plaza to enjoy food, friendship and entertainment with a barbecue, reminiscent of the early years at Texas A&M. The day closes with the Roll Call for the Absent ceremony, when over thirteen thousand people come together to honor and remember those who are no longer with us. Following the Singing Cadets, Aggie Band and Muster speaker, lights are dimmed and the roll call is called for Aggies who are no longer with us.

As each name is called, a candle is lit and a friend or family member answers “here” to remind us all that each Aggie, though no longer present in body, will always remain with us in spirit. Muster will continue to serve as the foundation of Aggie Spirit, upholding those ideals and principles common to all students of Texas A&M, common to all Aggies, forever.

Corps of Cadets

The tradition of the Texas A&M University Corps of Cadets, a student military organization, is as old as the university itself. Originally established as an all-male military college, Texas A&M remained a primarily all-male military institution with mandatory membership in the Cadet Corps until 1965, when Corps membership became voluntary. The Corps brings young women and men from all walks of life into the ultimate Aggie experience. The military-inspired cadet program provides students a structured lifestyle where academic excellence is emphasized, balanced with a university life rich in extra-curricular and leadership opportunities available only to Corps members. Through the Corps experience, cadets learn master management and organizational skills and build their leadership capability. Many cadets graduate with an Academic Certificate in Leadership Studies along with their selected degree and begin careers in business, nonprofit or government. However, approximately 40 percent become commissioned officers and join one of the Military services upon graduation. Texas A&M has consistently produced more military officers than any other institution in the nation, except for the service academies. More than 225 of its graduates have become generals or admirals.
College of Agriculture and Life Sciences & Texas AgriLife Research

Agriculture and the life sciences have been an integral part of Texas A&M since 1876, when it was founded as the “Agricultural & Mechanical College of Texas.” From long-established majors such as agronomy and animal sciences to newer programs such as forensics and spatial sciences, the College of Agriculture and Life Sciences is widely recognized as a leader in dozens of academic disciplines. The Department of Nutrition and Food Science is the newest of the departments formed in 2005 out of interdisciplinary programs from animal science, biochemistry, soil and crop, and poultry science. Our College is rich with award-winning faculty members discovering the fuels of the future, unlocking genetic mysteries, curing diseases, and working to ensure the safety and abundance of the food supply. We have over 7,800 students (57% female) enrolled in the college that choose courses of study from more than 31 undergraduate majors, 37 masters degrees, 24 doctoral degrees from 15 academic departments. With dedicated faculty and over 60 academic advisors committed to student success, our college is a place that combines world-class research and teaching with genuine Aggie friendliness. Texas A&M graduates more students in agriculturally-related fields than anywhere else in the country. Our former students are in positions of leadership in industry, business, government, and non-profit sectors around the world.

Food Science and Nutrition

The Food Science and Technology as well as the Nutritional Sciences programs at Texas A&M University had their formal beginnings in the years immediately after World War II. The need for a prescribed academic and research program was accentuated by the wartime crisis for preserved food and nutrition. President Lyndon B. Johnson, then a U.S. Representative, worked with Dr. G. W. Adriance in 1943 to obtain equipment necessary to install a canning facility on the A&M campus. The first professor to teach commercial food preservation was Professor F. R. Brison, who helped train people in the community to utilize the cannery during the wartime effort. “Mr. B” was happy to relinquish this responsibility to those returning from the war. Dr. R. F. Cain and Mr. T. S. Stephens actively set about to develop programs which utilized the cannery, that was initially established in Scoates Hall (Biological and Agricultural Engineering Building). Refrigeration facilities were acquired through war surplus and a gas-fired dehydrator was transferred from the Texas Agricultural Experiment Station at Angleton to College Station. Dr. Harold Reed moved from Angleton to College Station and carried out extensive dehydration experiments. He also was active in assisting the fig industry to meet wartime demands.

In 1947, a committee was appointed by Dean Shepherdson to develop a curriculum in Food Technology. This group included Dr. A. V. Moore in Dairy Husbandry, Mr. Roy Snyder in Animal Husbandry, Mr. Price Hobgood in Agricultural Engineering, Mr. H. M. Reed in Horticulture, and Mr. E. D. Parnell in Poultry Husbandry. The first degree was first offered in 1948 as an intensive five-year program, and although the enrollment was not large, the graduates were outstandingly successful in the food industry. In 1951, it was decided to concentrate the curriculum into a four-year plan. This had the effect of enriching the training, and the Texas A&M University program has since been a model of basic scientific training for the food technologist. The Institute of Food Technologists (IFT) has traditionally honored the program as one of the best and the curriculum has been approved by IFT since the program’s inception. Texas A&M University was one of the twelve original universities in the United States to offer academic training in Food Technology. All three degrees, Bachelor of Science, Master of Science, and Doctor of Philosophy have been offered since the inception of the four-year program in the early 1950’s. Enrollment in Food Technology was almost non-existent until the Adriance Laboratory was built in 1956 on the west campus of Texas A&M and Dr. E. E. Burns was employed to develop a program in
food preservation. The building was dedicated in October 1956 at a meeting sponsored by the Texas Section of the Institute of Food Technologists. Dr. O. D. Butler, then in charge of the Meat Laboratory at Texas A&M University, was chairman of the Texas Section IFT. Texas A&M University president, David Morgan, and the Board of Directors were present. Chancellor M. T. Harrington dedicated the building as the Adriance Laboratory in honor of the first head of the Chemistry Department at Texas A&M University and also the father of Dr. G. W. Adriance, then head of the Department of Horticulture. Mr. Ben Golub, President of Towie Food Company, accepted the facility on behalf of the food industry of Texas.

Coursework in food processing was immediately offered by Dr. Burns, and in response to an IFT scholarship announcement by Dr. A. V. Moore, six undergraduates transferred to the Food Technology option. The Dean of Agriculture, Dr. Jimmie Adams, appointed a Food Technology Committee consisting of Dr. A. B. Moore as chairman and Dr. O. D. Butler and Dr. E. E. Burns as members to develop and expand the program. The program grew slowly and in 1962, Dean R. E. Patterson established the Animal Science Department as the coordinating department for the program. This facilitated the flow of paperwork and identified the food technology staff. Student enrollment increased first at the graduate level. The Food Technology Committee felt that outstanding scientists in the various commodity areas could offer graduate courses for a limited numbers of students in coordination with ongoing research programs. An informal graduate student discussion group was formed in 1971. Students participated actively from the various departments, and undergraduates were gradually included in the group. This resulted finally in the formal recognition of the Food Science and Technology Club in 1974. The name of the curriculum was finally changed from ‘Food Technology’ to ‘Food Science and Technology’ in 1976. This program was very successful and was the foundation of the Nutrition program at Texas A&M University.

Growth of the academic program in Food Science and Technology has paralleled the recent growth of Texas A&M University and the admission of females to the University in 1972 has had considerable impact the number of Food Science graduates. To better serve the needs of students, Dr. R. C. Potts, Associate Dean of Agriculture, asked Dr. E. E. Burns to develop a Foods and Nutrition option, within the Food Science and Technology program, which would be acceptable to the American Dietetic Association (ADA, now known as the Academy of Nutrition and Dietetics or AND). After three years of work, the program was accredited by the ADA in January 1977. Meanwhile, tentative approval had allowed enrollment of students in the program. The first nutrition students graduated in May of 1977.

There are currently two options in Food Science and Technology and three options in Nutrition. The Food Science option, approved by the IFT, prepares students for technical careers in food science while the Industry option developed by Dr. C. W. Dill was designed to serve the immediate needs of industry. The Industry option proved to be popular and increased the enrollment in the program. Many of these students have gone on to take additional courses required for graduate school and have done well. A Foods and Nutrition option in Food Science and Technology was initially disapproved by the Texas Higher Education Coordinating Board, but in 1982, the Foods and Nutrition option was revised and called Scientific Nutrition, which was accepted by the Texas Higher Education Coordinating Board. The Scientific Nutrition program was developed by Animal Science Department faculty in the Human Nutrition section and additional nutrition courses were added to the curriculum. Students seeking a Scientific Nutrition degree also took a number of Food Science and Technology courses. The Food Science and Technology program was managed by an interdepartmental committee that made curriculum changes and met IFT guidelines until 2012. Programs in Seafood Technology and Dairy Technology were offered for several years, but were discontinued when key professors retired or left the University. Our nutrition students currently have the option of a General Nutrition, Experimental and Molecular Nutrition, or follow the Didactic Program in Dietetics (DPD). The general track is designed to prepare the average nutritional science student as a pre-professional leading to various career paths including medical, dental, veterinary, and other para-professional tracks. The experimental and molecular track is designed for future graduate students and those who which to perform research. This track has suffered recently due to insufficient faculty to teach the advanced courses, but is set to be reinstated by Fall 2016 or Spring 2017. The DPD track is accredited by
the Accreditation Council for Education in Nutrition and Dietetics (ACEND) and is designated for students wishing to become registered dietitians. The graduate faculties of nutrition and food science were formed in the early 1990’s as an interdisciplinary approach to research and graduate education in specific discipline areas. The Interdisciplinary Graduate Faculties of Food Science and Technology, Nutrition, and Toxicology all relate directly to foods and many faculty belong to multiple programs. These programs were voted out of existence by faculty members and the graduate programs in Nutrition and Food Science (separate degrees) moved to the NFSC department in 2012 as a result of faculty commitment and the results of a 2009-2010 external review of these graduate programs.

Graduate Faculty of Nutrition

The first efforts to implement a program in nutritional sciences began with the establishment of the Texas Agricultural Experiment Station in 1888. The program was under the leadership of agriculture, with input provided by the chief chemist in the chemistry department. Some of the earliest nutritional experiments involved feeding trials with dairy cattle as a backup to proximate analyses performed on feedstuffs. A focus at the time was on cottonseed and research led to the first report that cottonseed and cottonseed meal fed to dairy cattle elevated the melting point of butter produced from the milk from these cattle. Thus, the groundwork was laid for future studies on what turned out to be cyclopropenoid fatty acids and differential fatty acid metabolism which spurred further development of the nutritional sciences on the College Station campus.

It was not until 1937 that the first graduate courses in nutrition were taught. These courses were offered in several separate administrative units of animal husbandry. In 1947 a stronger biochemical basis for nutrition emerged and the integration of extension, experiment station, and academic faculty into the new department of Biochemistry and Nutrition. In 1966, the combined missions in biochemistry and nutrition separated and a general agreement that courses and faculty members in nutritional sciences would become allied with faculties of Animal Science, Poultry Science, and Biochemistry without nutrition as a separate department. The reorganization spurred new growth in nutrition and new courses. In the late 1960’s Dean H.O. Kunkel established the institute of human nutrition within the Department of Biochemistry and Biophysics. The institute led to the hiring of new faculty devoted to nutritional sciences.

In 1978 a renewed institutional focus in nutritional sciences occurred and in 1980 graduate degrees in ‘Animal Nutrition’ were changed to ‘Nutrition’ and in 1982 a B.S degree in ‘Scientific Nutrition’ was also offered within the Department of Animal Science. The Interdisciplinary Faculty of Nutrition (IFN) was approved in 1989-1990 to run the graduate programs and to stimulate student and faculty interactions. Following an external review of our graduate programs in 2009-2010, a recommendation was made to merge IFN with the department of Nutrition and Food Science (NFSC) and this was completed in 2012 to merge the undergraduate and graduate program under one administrative roof.

Graduate Faculty of Food Science and Technology

The Food Science and Technology program followed a similar history as Nutrition, being primarily housed in Animal Science and supported by the Interdisciplinary Graduate Faculty of Food Science and Technology (IFS) to cover a broad range of academic aspects of Food Science and Technology as well as allied disciplines that strengthen the graduate curriculum and enhance the academic rigor of the discipline. Likewise in 2012, after an external program review, the IFN was folded into the NFSC department under a single department head. There is still a strong interdisciplinary focus to the program, with a majority of the faculty administratively located in other academic departments. The program reviews and accepts applicants for admission, teaches graduate courses, assists with course assignments, performs periodic curricula assessments, approves new courses for submission to the College Graduate Program Committee, makes scholarship assignments, and ensures a rigorous course of study for M.S. and Ph.D. candidates. The location of a majority of our food science faculty outside of the NFSC department has positive and negative consequences in that these faculty members are strong supporters of our discipline but overall lack strong institutional support for our program due to this fragmentation, competing departmental interests, and poor distribution and allocation of resources.
Mission and Goals

In 1997, Texas A&M embarked upon a comprehensive evaluation and planning program with the aim of securing recognition as a consensus “Top 10” public university by the year 2020 under the direction of then-President, Dr. Ray Bowen. The program known as “Vision 2020” was intended to build upon Texas A&M’s tradition of excellence, while identifying areas requiring improvement and recommending necessary action, without sacrificing the core values upon which the university is solidly founded or its proud and unique heritage. The report, Vision 2020: Creating a Culture of Excellence, sets forth individual recommendations categorized into 12 “imperatives” relating to all aspects of Texas A&M and its relationships with students, faculty, staff, the community and the state, nation and world it proudly serves.

The 12 “imperatives” include:

1. Elevate Our Faculty and Their Teaching, Research, and Scholarship
2. Strengthen Our Graduate Programs
3. Enhance the Undergraduate Academic Experience
4. Build the Letters, Arts, and Sciences Core
5. Build on the Tradition of Professional Education
6. Diversify and Globalize the A&M Community
7. Increase Access to Intellectual Resources
8. Enrich Our Campus
9. Build Community and Metropolitan Connections
10. Demand Enlightened Governance and Leadership
11. Attain Resource Parity with the Best Public Universities
12. Meet Our Commitment to Texas

Former TAMU President Robert Gates who served from August 1, 2002 through December 18, 2006 when he was sworn in as the 22nd Secretary of Defense, embraced Vision 2020 and elected to focus initially on four areas embedded in the original imperatives, plus one new imperative:

1. Elevate the faculty (Imperative 1)
2. Improve graduate and undergraduate programs (Imperatives 2 and 3)
3. Diversity and globalization (Imperative 6)
4. Improve space (New Imperative 13)

The NFSC department has embraced these institutional goals and coupled our own mission statements and program goals to reflect our core values and educational goals for our students.
Mission of the NFSC Undergraduate Programs in Nutrition and Food Science

To prepare future leaders for academic, industry, or government careers by providing exceptional undergraduate programs, internships, and experiential learning activities that are relevant to the development of a strong technical background, essential critical thinking and communication skills, an appreciation for diversity and professionalism.

Mission of the NFSC Nutritional Science Graduate Program

To lead in the discovery and dissemination of new Nutrition knowledge through education and training of graduate students, understanding the operational mechanisms of biological systems, development of innovative strategies, and formation of alliances that provide high quality nutritional research, promote health and enhance the quality of life for Texans and others over the world.

Mission of the NFSC Food Science Graduate Program

To lead in the discovery and dissemination of new Food Science knowledge through education and training of graduate students, understanding the operational mechanisms of biological systems, development of innovative technologies, and formation of strategic alliances that provide high quality foods, promote health and enhance the quality of life for Texans and others over the world.

NFSC Program Goals for Undergraduates in Nutrition and Food Science

Goal #1. Undergraduate students will demonstrate effective written and oral communication skills


Goal #2. Undergraduate students will demonstrate critical thinking skills by scoring >80% on identified assignments/exams

Goal #3. Undergraduate students will be prepared with skills to engage in lifelong learning through participation in faculty research activities, experiential learning opportunities and/or corporate internships to refine their career interests, learn essential research skills, and promote inquisitiveness and independent thought.

Measures: Rubric evaluation of identified assignments, graduating senior surveys, former student surveys, employer/supervisor surveys

Goal #4. Undergraduate students will demonstrate technical knowledge.

Measures: Rubric evaluation of identified assignments, former student surveys, employer/supervisor surveys

NFSC Program Goals for Graduates in Food Science

Nutritional Science Goal: To prepare graduate students to be qualified professionals in Nutrition or Dietetics and related research areas

Food Science Goal: To prepare graduate students to be qualified professionals in the Food Science industry and related research areas.

Administrative Structure of Department and Programs

The structure of the department is one of a Department Head (Dr. Boon Chew) with decision-making authority for the entire department. In addition, the head is assisted by 2 associate heads, one in academics (Dr. Steve Talcott) and one in extension (Dr. Jenna Anding). Independent, faculty-led committees are responsible for our different program areas and have responsibility for the academic programs. The Undergraduate Programs Committee (UPC) for Nutrition and Food Science is organized by the faculty in both standing and ad-hoc committees that report to the full faculty for discussion and voting. The Graduate Program Committee (GPC) was formed and maintained through an elected body of faculty consisting of four members each of Nutrition and Food Science graduate faculty. Lastly, the Assessment Committee evaluates the course level and program level goals and student learning outcomes for curricular assessment and makes recommendations for program changes. All committees operate independently and report to their full faculties for majority vote and passed items are conveyed to the department head for final approval or advancement to the College/University level. The department is supported by professional administrative, business and advising staff. Our advising office consists of a Senior Academic Advisor II, Academic Advisor II and a Graduate Program Coordinator. The business office is managed by the Business Administrator II which consists of a Business Coordinator II, Business Coordinator I, Facilities Coordinator, and a Business Associate who handles all of the department travel arrangements. Administratively, we are supported by an Assistant to the Department Head, an Administrative Coordinator, a Senior Office Associate as well as numerous student employees.
Standing Undergraduate Program Committees

- Faculty Advisory Committee (elected)
- Staff Advisory Committee (elected)
- Undergraduate Program Committee
  - Sub-committee on ACEND accreditation
  - Sub-committee on IFT accreditation
  - Sub-committee on academic assessment
- Dietetic Internship Advisory Committee
- Committee on Awards, Scholarships, and Fellowships
- Faculty Tenure and Promotion Committee
- Facilities Committee
- Safety Committee
- Awards Committee

Standing Graduate Program Committees

- Graduate Program Committee
  - Graduate Assessment Committee
  - Nutrition and Food Science
    - Sub-committee on admissions
      - Nutrition and Food Science
    - Sub-committees on curriculum
      - Nutrition and Food Science
    - Sub-committee on awards, scholarship, fellowships

Department and Program Resources

Academic Facilities

Most of the department currently occupies a newly renovated building (Cater-Mattil Hall) since July 2014, a move from its historical location in the Kleberg Animal and Food Science Building across the street. The department still occupies 2 teaching laboratories in Kleberg that includes a small test kitchen for food preparation/culinary and experimental foods laboratory experiences and a multi-use laboratory holding 30 students for food chemistry, food analysis, food safety, and molecular methods in biochemistry, as well as a faculty research laboratory. Two faculty occupy research space in the Centeq Research Plaza in Research Park on the west side of campus with 3 laboratories, 4 offices, a sensory facility, and small research kitchen. The remaining faculty, lecturers, and extension group reside in Cater-Mattil which houses 7 research laboratories, 4 common use laboratories, 30 offices, and 3 conference rooms in addition to administrative space. The department has a teaching wet chemistry laboratory (Kleberg) can accommodate 32 students, and a small test kitchen with commercial ovens, stoves, and 6 work stations that can accommodate 18-24 students. All other research, teaching, or pilot facilities are operated by faculty in other departments and can be used with prior notification and training. Individual research faculty have various research capabilities within this respective laboratories, but the faculty and department are working hard to share and/or purchase core research equipment that can also be used for teaching. Centers of excellence and available pilot facilities include:

1. Rosenthal Center, Animal Science
2. Cereal Quality Lab, Soil and Crop Science

Department of Nutrition and Food Science Academic Program Review 2016
3. Fruit and Vegetable Processing, Horticulture
4. Food Protein Research and Development Center, College of Engineering
5. Center for Food Safety, Agrilife
6. National Center for Electron-Beam Research, AgriLife
7. Animal Nutrition/Physiology Center; Animal Science
8. Poultry Science Teaching, Research, and Extension Center, Poultry Science
9. Small Animal Clinical Nutrition Research Facility, Veterinary Medicine
10. Aquacultural Research and Teaching Facility, Wildlife Fisheries
11. Applied Exercise Science Laboratory Facility (Netum Steed); Exercise Physiology

Finances

The NFSC department is based on a Land Grant system of institutional funding of academic and program enhancement as well as external grants from a variety of sources including non-state funds, contracts, donations, and other funding sources such as research grants that pay tuition.

<table>
<thead>
<tr>
<th>FY 2014 ($)</th>
<th>Teaching Income</th>
<th>Teaching Expenditures</th>
<th>Research Income</th>
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External Program Accreditations

Two of our academic programs are nationally accredited, and are current and in good standing. The dietetics program is accredited through The Accreditation Council for Education in Nutrition and Dietetics (ACEND®) and the Food Science and Technology program is accredited through the Institute of Food Technologists (IFT).

Date of Last APR External Review

- September 3, 2009 (Graduate Program in Food Science). Reviewers Drs. Suzanne Nielsen, Donald Schmidt, and Pamela White.
- May 2, 2010 (Graduate Program in Nutrition). Reviewers Drs. Andrew Clifford, Jeanne Freeland-Graves, and Evan Titgemeyer.
- May 5, 2010 (Undergraduate Program).

Analysis

Following strategic meetings and the transition among department heads over the past couple of years, the academic programs have worked to develop better plans for improving our academic environment and aligning our department’s goals with that of the Vision 2020 (Texas A&M) and the “5 Grand Challenges” within our College. The 5 Grand Challenge areas include “Feeding our World”, “Protecting Our Environment”, “Improving Our Health”, “Enriching Our Youth”, and “Growing Our Economy”. Obviously, a nutrition and/or food science program fits well within several of these challenge areas. To help with understanding our program from within, we went through a classic SWOT analysis to help self-identify areas of concern. This includes:

Strengths:

- Our faculties have unique areas of expertise across a diversity of disciplines
- Our faculty are productive in terms of grant acquisition (federal, state, corporate, commodity based), forming corporate research partnerships, publication of scientific manuscripts and generating translational research
- Our curriculum allow for both hands-on practical learning applications in limited pilot plant and culinary processing facilities as well as basic science knowledge, giving a solid background in basic nutrition and food sciences
- Graduate students compete well at professional meetings in poster/oral competitions
- TAMU graduates are sought by corporate employers prior to or shortly after graduation
- The department provides scholarships and travel awards to attract high caliber graduate students, support travel to professional meetings and ensure that research in their respective laboratories is visible
- Our faculty has received recognitions of their professional achievements

Weaknesses:

- Our faculty’s dispersal across Departments/Colleges at both the undergraduate and graduate faculty level and our individual commitments to our home departments hinder the faculty’s ability to effectively operate cohesively. Simply calling a meeting, participation in programmatic activities, social events, and/or student events are strained and lack the full attention of the faculties. This is especially true for the food science program, where faculty teaching required undergraduate courses are not under the administrative control of the NFSC department. Additionally, we also lack unity at the graduate level and are not working towards
a common goal that advances nutrition or food science.

- Recruitment of top students across the U.S. could be enhanced with better website, social media, and resource allocations for program recruitment. It is currently up to individual faculty to recruit top students to their programs.

- Few commodity groups or industry areas are supported within the disciplines due to the lack of basic facilities to host and conduct basic and applied research. The NFSC department has no pilot facilities for educating students on basic principles of food and nutrition under its control. Existing facilities located in other departments are very poorly maintained and access is limited.

- There is a need for BL-2 animal and plant food processing facilities for food safety studies.

**Opportunities**

- We have recently hired 4 new nutrition faculty members in the general area of Chronic Disease and look forward to their individual and programmatic contributions to our faculty.

- We hope to hire 3 additional faculty in the area of food science and nutrition and a state-wide food extension specialist in the area of food processing.

- With the architectural design of a new “Food and Nutrition Center”, we will begin to raise funds for a new building to enhance the capabilities of our faculty.

- Addition of new NFSC graduate courses will accompany the hiring of our new faculty and will allow for curriculum revision and expansion, especially in the areas of chronic disease.

- Industry internships and/or partnerships could be expanded as a means of providing graduate student learning experiences and research program support. A new “Food and Nutrition Center” is an excellent focal point for this interaction between faculty, students, and industry.
Building the Future
Nutrition, Foods, and Health

Conceptual Rendering
PREVENTION OF CHRONIC ILLNESSES THROUGH FOOD

UNDERSTANDING RELEVANT BIOLOGICAL MECHANISMS:
Genomics, Metabolomics, Immunology, Microbiomics

Cancer: R. Chapkin, S. Talcott, C. Allred, N. Turner
Obesity/Diabetes: C. Wu, S. Guo, Y. Sun, L. Xie, E. Giles

TRANSLATIONAL ACTIVITIES:
Clinical trials, Community nutrition & dietetics, International nutrition

Community Nutrition: J. Anding, S. Robinson, K. Kubena
Program Evaluation: P. Murano
International Nutrition: Need
Food Safety/Processing: E. Murano, Need

FOOD-BASED INTERVENTIONS:
Bioactives, Prebiotics, Probiotics

Bioactives: St. Talcott, Need
Pre- & Probiotics: Need

Healthy Population
Threats

• Vacancies created by food science or nutrition faculty that are administratively located in other departments due to retirement or vacancy may not be replaced with faculty of similar skills or even replaced at all in a timely manner, thus putting our curriculum at risk (essential courses might not be taught). We are never guaranteed faculty replacement and a teaching or academic program need is not an accepted justification for new positions.

• Essential courses on transcripts not cross-listed as NUTR or FSTC may reduce our visibility or creditability of the discipline for undergraduates and graduates (i.e., Animal Science, Poultry Science, Soil and Crop Sciences, Horticultural Sciences, Biological and Agricultural Engineering, Health and Kinesiology, Veterinary Medicine, Public Health, etc).

• Teaching a NUTR or FSTC course must be approved by department head of the administrative location of the instructor of record, giving NFSC no control over who teaches our classes or when they are taught. Teaching and enhancement funds and laboratory fees are returned to the department of the instructor of record, limiting the NFSC from improving our teaching environment and infrastructure.

Program Improvements Since Last APR Review

The integration of the graduate programs into the NFSC department and comprehensive curriculum reviews in both Nutrition and Food Science were the major program improvement since our last reviews. The most difficult was the dissolving of two Intercollegiate Faculties (Nutrition and Food Science), both of which held degree-granting authority for the two programs. This process involved major efforts on the part of the NUTR and FSTC interdisciplinary faculties and leadership from our College. This process took well over a year to accomplish and another year to fully implement the transition of the degree programs and curricula to the NFSC department. The transition was completed in fall 2012.

To complete the transition following our 2009 (FSTC) and 2010 (NUTR) external reviews, we enacted major curriculum reviews at both the graduate and undergraduate level, which also created, developed, and implemented our formal Assessment Committee. The assessment was initially aimed at the undergraduate programs (see data collection chart) and those efforts moved to graduate-level assessment in the past 3 years. An example of our biennial assessment plan for select undergraduate courses includes a two-part plan to assess our program across any given semester for comparison and similarities and also to assess the program from start to finish in effort to track the progress of each graduating class.
### Oral and Written Communication

<table>
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<th>Summer Semester 2015</th>
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<th>Spring Semester 2016</th>
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<tr>
<td></td>
<td></td>
<td>FSTC 401 Awika</td>
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### Life Long Learning
Reported from graduating senior surveys, data collection, e-portfolios

### Technical Knowledge

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### Critical Thinking Data

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The curriculum reviews involved dialog among our many faculty and allied faculty to both understand our current/future needs and to create solutions to these problems. Among the solutions, changes were made to both nutrition and food science program areas. The by-laws for the NFSC program were revised to reflect the new organizational structure and the GPC was created as a compromise among the Interdisciplinary Faculties to insure that representation was equivalent between Nutrition and Food Science and among core NFSC faculty and those graduate faculty members administratively located in other departments.
Nutrition Program Changes

- Two nutrition degree tracks were developed: General Nutrition and Experimental and Molecular Nutrition. These tracks were used to support students interested in the nutrition degree as a pre-professional program from those interested in nutritional research.
- Eligibility requirements were established for the DPD track to meet needs for accreditation.
- Separate course requirements were established for the Experimental and Molecular Nutrition tract, including specialized courses and a hands-on molecular methods course. This tract is still not in its final form, as we adjust to new faculty hires and new course developments.
- The critical need for more scientific writing and critical thinking in lower division courses was identified during curriculum review. A 1-credit hour course to complement NUTR 203 Scientific Principles of Human Nutrition was proposed to offer students opportunities to write earlier in the curriculum and to practice critical thinking skills in a smaller class-size setting. The course Current Perspectives in Nutrition was pilot tested during two semesters. However, the course is currently in the process of modification in content and delivery format and is projected to be offered spring 2017.
- Review of course learning objectives from all nutrition courses indicated a deficiency in content knowledge related to micronutrients. The creation of a new core course that specifically addressed vitamins and minerals was proposed. NUTR 489 Special Topics: Nutritional Physiology of Vitamins and Minerals was taught two times (spring 2013 and spring 2014). The course now has a permanent number (NUTR 365) and is projected to be offered spring 2017.
- Goals and course-level outcomes were developed. Standard rubrics for our goals were developed by committees.

Food Science Program Changes

- Made NUTR/FSTC 210 (Horizons in Nutrition and Food Science) a required, core course
- Created a “majors only” section of FSTC 201 (Introductory Food Science)
- Created FSTC 444 (Fundamentals of Food Law) and made it a required, core course in 2015
- Students were taking courses out of normal sequence, so we altered our course sequences and set pre-requisites for select courses. By setting and adhering to early sequence standards, the curriculum has become more balanced and our students progress through our courses more uniformly and as a unified class.
- The Master of Science Non-Thesis option was removed from the curriculum. Students wishing to receive a non-thesis degree can enter the Master of Agriculture program instead.
- Goals and course-level outcomes were developed. Standard rubrics for our goals were developed by committees.
Academic Programs and Curricula

Programs Offered

The nutrition and food science graduate programs joined NFSC for the first time in the fall semester of 2012 after existing as separate programs managed by the Intercollegiate Faculty of Nutrition and the Intercollegiate Faculty of Food Science since their inception. The department’s graduate faculty is still intercollegiate in nature with members from various Texas A&M departments including Kinesiology, Poultry Science, Animal Science, Horticulture, Sociology, Biological and Agricultural Engineering, and the Health Science Center. The NFSC offers Masters and Doctoral degrees in both nutrition and food science. Nutrition students can apply for either the M.S. or Ph.D., while food science students have a Master of Agriculture option in addition to the M.S. and Ph.D. curricula.

- The Masters and Doctoral programs in Nutrition allow emphasis in the broad fields of basic and applied animal and human nutrition. Candidates may perform research in the areas of nutritional biochemistry and molecular biology, animal nutrition, and community or international nutrition. Studies in animal nutrition may be related to animal agriculture or may be fundamental in nature. Human or domestic animal nutrition specialization can be obtained in physiology, immunology, biochemistry, molecular and cell biology, and applied nutrition.

- The Food Science Masters and Doctoral degrees may be obtained through appropriate course of study, completion of research or other requirements, successful completion of university-directed administrative procedures, and successful defense of the thesis, dissertation, or other final document. Students may pursue fundamental and/or translational (i.e. applied) research in the areas of food chemistry, products processing, food microbiology and safety including probiotic microbiology, engineering and rheology, food packaging, ingredients technology, meat or poultry science, cereals science and processing, plant bioactives, sensory analysis, etc. A process of research or study will be outlined by the student with guidance from the student’s graduate advisory committee membership.

Along with our formal academic degree programs, the NFSC department offers both nutrition and food science graduate seminar series, a dietetic internship program, research-based symposia (bi-annual Nutrition and Food Science Conference and Obesity Symposia), an Honors NUTR program, and a developing program in Food Diversity. The goal of these additional programs is to allow students to broaden their knowledge in cutting edge issues in nutrition and food science.

- During our seminar series, students have unique opportunities for interaction and professional discourse which opens doors of professional opportunity. For example, through our seminar series students improve their technical communication skills and serve to educate peers on current events and professional activities. A typical semester will also have up to 7 external speakers from all over the country and world and who are top nutrition and food science researchers in their field. Most of the seminars are recorded and made publicly available on the department’s YouTube page; a recent seminar with Dr. Yves Desjardins, Professor from Université Laval’s Institute of Nutrition and Functional Food has received nearly 3000 views.

- The dietetic internship program is comprised of two internship options including the dietetic internship with a graduate degree option and the internship only or non-degree option. The programs were re-accredited in January 2016 for seven more years. In the past 10 years the class enrollments have ranged from 1 to 11 interns with 293 graduates to date in the graduate program and 13 interns in the non-degree option. The 2016 class of 11 interns is currently completing their supervised practice, which consists of no less than 1,200 supervised practice hours in clinical dietetics, community nutrition, and food service management and 100% of our 2015 class passed their exam to become a registered dietitian.

- The department faculty also hosts a bi-annual symposium on Food and Nutrition to serve as an educational program in current events impacting our industries. The 2015 symposia on “Stealth Health: Reducing Sodium in the Food and Diet” featured speakers from the medical, food,
and community education fields educating our students and professionals on this current event. We also host a research conference on chronic disease and obesity, led by Dr. Chaodong Wu as part of an effort in forming a Nutrition Obesity Research Center; a second symposium will be held April 2016.

• The Honors Program in Nutritional Sciences was approved and began in fall 2012. Admission and continued enrollment requires an overall GPR of 3.50, and also a 3.25 GPR in honors classes and satisfactory progress towards completion of 18 credits in honors level courses. In academic year 2015-16 there were 5 honors courses available (NUTR 203, 301, 404, 405, and 470) in addition to availability of honors credit by course contract, directed study (NUTR 485), or undergraduate research (NUTR 491). Enrollment for 2016 honors is 28 students with 7 students already completing the program and 4 expected to graduate in May 2016.

• Lastly, we have begun work to develop a program in Food Diversity that was funded by a generous program endowment in fall 2015. The program is led by Dr. Mian Riaz and will involve an advisory board to set an addenda and direction for educational and research programs in ethnic foods, food and culture, and food safety/processing and ingredients that meet a diverse population.

A complete catalog description of degree requirements for the degrees can be found on-line in the graduate catalog at: [http://catalog.tamu.edu/](http://catalog.tamu.edu/)

• B.S. Nutrition or Food Science and Technology
  (120 Credits)
• M. Agr. (Master of Agriculture; 36 credits)
• Non-Thesis M.S. Nutrition, 36 credits
• Non-Thesis M.S. in Clinical Nutrition (Pending: Target 2017 or 2018)
• Non-Thesis M.S. Food Science and Technology
  (to be discontinued in 2017)
• M.S. Nutrition, 33 credits
• M.S. Food Science and Technology, 32 credits
• Ph.D. Nutrition, 64 or 96 credits
• Ph.D. Food Science and Technology, 64 or 96 credits

## Bachelor’s Degree in Nutritional Sciences

Nutritional Sciences prepares majors with a comprehensive knowledge of the biological and social sciences to understand the relationships between nutrients, food components and human health. Prevention of diseases that are related to lifestyle, particularly diet and nutrition, is a focus of the curriculum. Core courses emphasize the role of nutrients in biochemistry, genetics, physiology, microbiology and immunology that promotes wellness and enhances the quality of life. The major also provides an excellent background for those interested in pursuing graduate degrees in biological, nutritional or food sciences; professional degrees in human or veterinary medicine; degrees in dentistry, pharmacy, physical therapy, nursing, public health and other health professions; or dietetic internships.

The Didactic Program in Dietetics (DPD) and the Graduate Degree/Dietetic Internship Program are accredited by the Accreditation Council for Education in Nutrition and Dietetics (ACEND). Students must successfully complete the DPD program to apply for and be accepted into a dietetic internship program. Eligible TAMU DPD students may apply to the TAMU dietetic internship program. Students who successfully complete the DPD and a dietetic internship are eligible to take the Registration Examination to become a Registered Dietitian (RD).

Three curriculum tracks are offered (General Nutrition, Didactic Program in Dietetics and Molecular and Experimental Nutrition) to provide flexibility in one’s chosen career path. The Nutrition major prepares one for graduate school, corporate wellness positions, health promotion programs, the food industry, public health programs, pharmaceutical sales, clinical dietetics, medical professions, research laboratories, biotechnology firms, government agencies and related fields. For more information, visit [http://nfs.tamu.edu](http://nfs.tamu.edu).

### Didactic Program in Dietetics Track

The DPD is accredited by the Accreditation Council for Education in Nutrition and Dietetics (ACEND) and is designed to prepare students for meeting the requirements for entry into a dietetic internship (DI) program and ultimately earning the Registered
Dietitian (RD) credential. The DPD track has strict eligibility requirements that must be met. This track provides a strong science base and foundational courses in nutrition for students desiring dietetic practice in clinical, therapeutic, community wellness, public health or food production/service settings.

**General Nutrition Track**

The General Nutrition Track provides a wide range of approved electives in biochemistry, nutrition, food science, microbiology, immunology, genetics, and psychology in order to customize a degree suited to research interests and career objectives. Through this program, students are prepared to work in community wellness programs, sports nutrition, education, research, and as technical representatives in the nutrition and health industry. This is also an excellent program for students wanting to go to professional schools such as medicine, dentistry, physical therapy, physician assistant, or pharmacy.

**Teacher Certification**

The secondary Provisional Teaching Certificate may be obtained in conjunction with the Bachelor of Science degree in Nutritional Sciences, General Nutrition Track. There are three subject areas available for teacher certification through this degree: Biology/Life Science (grades 8-12), Chemistry (grades 8-12), and Science (grades 8-12). Students must also complete the STEM (Science, Technology, Engineering, and Mathematics) minor. Students interested in teacher certification should contact the teacher certification advisor in the Department of Teaching, Learning and Culture in the College of Education and Human Development for more information.

**Molecular and Experimental Track**

The Molecular and Experimental Track emphasizes a fundamental background in the biological and physical sciences that relate to human health and nutrition. This option offers students the opportunity to develop analytical and critical thinking skills through undergraduate research with department faculty, independent study and study abroad programs, and science-based curricula that is essential for graduate studies and pre-professional schools. The goal of this track is to enable students to seek employment in specialized science-based fields in the biological or medical sciences, to pursue graduate degrees beyond the baccalaureate or to enter professional schools of medicine, veterinary medicine, dentistry, pharmacy or similar disciplines. See academic advisor for information on application procedures, GPR requirements, specific course listings and eligibility requirements.

**Bachelor’s Degree in Food Science and Technology**

Food Science and Technology is an exciting multidisciplinary field that prepares majors with a comprehensive knowledge of the biological, physical and engineering sciences to develop new food products, design innovative processing technologies, improve food quality and nutritive value, enhance the safety of foods and ensure the wholesomeness of our food supply. Food Science majors apply the principles learned in the basic sciences such as food chemistry, biochemistry, genetics, microbiology, food engineering and nutrition to provide consumers with safe, wholesome and attractive food products that contribute to their health and well-being. For more information, visit [http://nfs.tamu.edu](http://nfs.tamu.edu).

The undergraduate curriculum is approved by the Institute of Food Technologists (IFT) and offers two tracks, a Food Science Option and an Industry Option. These tracks provide promising career opportunities in areas such as food product/process design, technical service, research and development, quality assurance, food safety, food law, regulatory oversight, technological innovation, marketing, corporate sales, sensory evaluation and operations management. There are numerous opportunities available for corporate internships, scholarships and study abroad programs that provide real-world experience and enhance opportunities for employment after completing a baccalaureate degree. The major also provides an excellent background for those interested in professional schools, graduate studies, medicine, veterinary medicine, dentistry, pharmacy, physical therapy, nursing, occupational therapy and public health.
Food Industry Option

The Food Industry option integrates knowledge from the basic disciplines of chemistry, microbiology, physics and biology and applies scientific principles from food engineering, food processing operations, sensory evaluation, food safety, HACCP, quality assurance and management to produce foods that are wholesome, affordable and safe. The goal of the curriculum is to prepare Food Technologists for careers in the food and related industries. These careers may involve food processing, manufacturing, technical service, food product development, operations management, regulatory oversight and other technology based opportunities.

Food Science Option

The Food Science option provides a strong knowledge base and fundamental understanding of chemistry, biology, engineering, physics, statistics, genetics, biochemistry, microbiology and nutrition that is applied toward the preservation, processing, packaging and distribution on foods that are wholesome, affordable and safe. The goal of the curriculum is to prepare Food Scientists for career opportunities in the food and allied industries or for further studies in graduate or professional schools.

Master of Science Program in Nutrition

The Nutrition Graduate Program offers two degrees: the Master of Science and the Doctorate. The MS option requires students to complete a minimum of 33 credit hours of graduate lecture, seminar, and research courses and to complete and defend a thesis. The core lecture courses are in nutrition, biochemistry, physiology, and statistics.

Master of Science in Nutrition Curricula (Total credits: 33)

- Nutrition or course cross-listed with nutrition – 6 credits
- Biochemistry – 3 credits
- Physiology – 3 credits
- Statistics – 3 credits
- Nutrition Seminar – 3 credits
- *2 hours of section 601 and 1 hour of section 602
- Directed Studies – credits vary
- Research – credits vary

Dietetic Internship

The Graduate Degree-Dietetic Internship Option is an accredited program with ACEND. Students complete the course requirements for graduate study in College Station and then an ACEND accredited dietetic internship. The primary affiliations for the dietetic internship are the Central Texas Veterans Health Care System, Baylor, Scott and White Memorial Hospital, CHI-St. Joseph Hospital, and Memorial Hermann Hospital. Other affiliations include Bryan Independent School District, College Station Independent School District, Texas A&M Extension Services, Excellence in Health, Brazos County/Bell County and Travis County WICs, Liberty Dialysis, and Texas A&M Athletic Department (for more information on rotation sites, visit http://nfs.tamu.edu/academics/dietetic-internship/rotationsites). Examples of rotations to which interns are assigned include the clinical specialties of cardiology, pediatrics, surgery, nutrition support, gastroenterology, psychiatry, physical medicine and rehabilitation, renal dialysis, and general medicine. Community nutrition rotations include those with public health, wellness programs, eating disorders programs, and a food distributor while food service management may be done in either the hospital or school food service setting. Successful completion of the Dietetic Internship Program allows the graduate to sit for the examination to become a registered dietitian.

The Dietetic Internship Program also has a non-degree option. Interns in this option are accepted into the internship program only, but not to graduate school. These interns have the same competencies and requirements of those in the Graduate-Dietetic Internship option. For more information regarding the Texas A&M Dietetic Internship Program, please visit http://nfs.tamu.edu/academics/dietetic-internship/.

Doctoral Program in Nutrition

Students are required to complete the core curriculum in Nutrition which includes the following academic areas: Biochemistry, Statistics, Physiology, Nutrition
and Seminar. At least 64 semester credit hours are required beyond the MS level or 96 semester credit hours beyond the B.S. level. Near or at the end of the didactic portion of the program, students take a preliminary exam intended to assess knowledge and competence in nutrition and related fields. Students passing the preliminary exam are admitted to candidacy for a Ph.D. degree.

The Nutrition Doctoral program requires students to complete the core curriculum in nutrition which includes the following academic areas: biochemistry, statistics, physiology, nutrition, and seminar. A single course may not be used to meet more than one core subject requirement. For example, NUTR 642 (Nutritional Biochemistry) may not be used for both biochemistry and nutrition requirements on the same degree plan. At least 64 semester credits are required beyond the Master of Science level or 96 semester credit hours beyond the Bachelor of Science level. The degree plan of the Ph.D. student is the responsibility of the student and the student’s graduate committee. The purpose of the core is only to provide a minimum number of courses in various disciplines to ensure that students receive a foundational education in nutrition. Near or at the end of the didactic portion of the program students take a preliminary exam intended to assess knowledge and competence in nutrition and related fields. Students passing the preliminary exam are admitted to candidacy for the Ph.D. degree.

### Doctoral Program in Nutrition Curricula with B.S. degree (Total credits: 96)

- Nutrition or course cross-listed with nutrition – 12 credits
- Biochemistry – 6 credits
- Physiology – 6 credits
- Statistics – 6 credits
- NUTR 681 Seminar – 6 credits
  *4 hours of section 601 and 2 hour of section 602
- NUTR 685 Directed Studies – credits vary
- NUTR 691 Research – credits vary

### Doctoral Program in Nutrition Curricula with M.S. degree (Total credits: 64)

- Nutrition or course cross-listed with nutrition – 6 credits
- Biochemistry – 3 credits
- Physiology – 3 credits
- Statistics – 3 credits
- NUTR 681 Seminar – 3 credits
  *2 hours of section 601 and 1 hour of section 602
- NUTR 685 Directed Studies – credits vary
- NUTR 691 Research – credits vary

The degree plan of the Ph.D. student is the responsibility of the student and the student’s graduate committee. The purpose of the core is only to provide a minimum number of courses in various disciplines to ensure that students receive a foundational education in Nutrition. The following is a list of courses that may be utilized to meet the requirements.

### Master of Science in Food Science and Technology

#### Thesis Option

Students must complete a minimum of 32 semester credit hours of approved courses, as well as research for the preparation and defense of a thesis. An acceptable thesis must reflect a comprehensive understanding of the pertinent literature and express in clear and legible English, the problem(s) for study, methodology, significance, and results of the student’s original research.

#### Required Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>FSTC 605</td>
<td>Chemistry of Foods (or equivalent)</td>
<td>3 credits</td>
</tr>
<tr>
<td>FSTC 606</td>
<td>Microbiology of Foods (or equivalent)</td>
<td>3 credits</td>
</tr>
<tr>
<td>FSTC 681</td>
<td>Seminar (or department seminar)</td>
<td>1 credits</td>
</tr>
<tr>
<td>FSTC 685</td>
<td>Directed Studies</td>
<td>will vary</td>
</tr>
<tr>
<td>FSTC 691</td>
<td>Research</td>
<td>will vary</td>
</tr>
<tr>
<td>FSTC 600+</td>
<td>Elective courses**</td>
<td>6 credits</td>
</tr>
<tr>
<td>STAT 600+</td>
<td>Elective courses</td>
<td>3 credits</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>32 credits</td>
</tr>
</tbody>
</table>

**At least 3 credit hours from coursework outside your area of interest.
Master of Agriculture

The Master of Agriculture degree is available for students who want professional, graduate training with a non-research (i.e. management, sales, or marketing) orientation in the food industry. It is a non-thesis degree, requiring a minimum of 36 semester credit hours past the baccalaureate degree (including FSTC 685). At least 12 credit hours must be taken from courses without an FSTC prefix and at most 3 credit hours at the 300 or 400 levels. Degree candidates are required to complete a professional internship or other significant professional development experience at the approval of the committee that is designed to develop problem-solving skills through meaningful, applied, practical experience (preferably in the food industry). A professional literature review and professional paper must be prepared and defended during the student’s final examination.

Master of Agriculture in Food Science (Total Credits: 36)

- FSTC 605 Chemistry of Foods – 3 credits
- FSTC 606 Microbiology of Foods – 3 credits
- FSTC 681 Seminar – 1 credit
- Food Science elective courses – 6 credits
- Statistics – 3 credits
- FSTC 685 Directed Studies – credits vary
- FSTC 684 Internship – 2-4 credits

Doctor of Philosophy in Food Science and Technology

Studies leading to the Ph.D. degree are designed to give the candidate thorough and comprehensive knowledge of his or her professional field, as well as training in research methods. The criteria for granting the degree shall be the candidate’s comprehension of the subject matter and a demonstrated ability to perform independent research. In addition, the candidate must have the ability to express thoughts clearly, both verbally and in written form. A minimum of 96 semester credit hours beyond the baccalaureate degree or 64 semester credit hours beyond the master’s degree, and a dissertation are part of the minimum requirements for the Ph.D. degree. Students, in cooperation with their graduate advisory committees, must complete a preliminary examination when they are within six hours of completing all formal coursework on their degree plan, after which they are admitted to candidacy for the Ph.D. degree.

Doctoral Program in Food Science Curricula (Total credits: 64 with M.S. degree or 96 with B.S. degree)

- FSTC 605 Chemistry of Foods – 3 credits
- FSTC 606 Microbiology of Foods – 3 credits
- FSTC 681 Seminar – 3 credits
- Food Science elective courses – 12 credits
- *At least 3 credit hours must be from coursework outside student’s area of interest
- Statistics – 6 credits
- FSTC 685 Directed Studies – credits vary
- FSTC 691 Research – credits vary

Ph.D. candidates must complete a total of 64 credit hours beyond the master’s degree or 96 credit hours beyond the baccalaureate degree (including FSTC 685 and FSTC 691 credit hours). Each student will develop a Degree Plan in conjunction with the major professor, specifying the courses that must be taken.
Degree Program Curricula

Courses for B.S. Nutritional Sciences

- **NUTR 202 Fundamentals of Human Nutrition**
  - Credits 3. 3 Lecture Hours
  - Fundamentals of Human Nutrition. Principles of nutrition with application to the physiologic needs of individuals; food sources and selection of an adequate diet; formulation of Recommended Dietary Allowances; nutritional surveillance; for non-nutrition majors only.

- **NUTR 203 Scientific Principles of Human Nutrition**
  - Credits 3. 3 Lecture Hours
  - Chemistry and physiology of proteins, carbohydrates, lipids, vitamins and minerals; their ingestion, digestion, absorption, transport and metabolism.
  - Prerequisite: CHEM 101 and CHEM 111. Majors only.

- **NUTR 210/FSTC 210 Horizons in Nutrition and Food Science**
  - Credits 2. 2 Lecture Hours.
  - Introduction to nutrition and food science career opportunities through presentations by nutrition and food science researchers and industry professionals; addresses issues of professionalism including portfolio development, teamwork, and critical thinking skills.

- **NUTR 211 Scientific Principles of Foods**
  - Credits 4. 3 Lecture Hours. 3 Lab Hours.
  - Basic principles underlying selection, preparation and preservation of food in relation to quality standards, acceptability and aesthetics. Introduction to composition, nutritive value, chemical and physical properties of foods; introduction to experimental study of foods.
  - Prerequisites: CHEM 101, CHEM 111; NUTR 202 or NUTR 203; sophomore classification or above.

- **NUTR 222 Nutrition for Health and Health Care**
  - Credits 3. 3 Lecture Hours
  - Analysis of nutrition with emphasis on providing a basic understanding of nutrition and its role in disease prevention and treatment.

- **NUTR 285 Directed Studies**
  - Credits 0 to 4. 0 to 4 Other Hours.
  - Directed study of selected problems in the area of nutrition.
  - Prerequisites: Approval of instructor; 2.0 GPR in major and overall.

- **NUTR 289 Special Topics in...**
  - Credits 1 to 4. 1 to 4 Lecture Hours.
  - Selected topics in an identified area of nutrition. May be repeated for credit.
  - Prerequisite: Approval of department head.

- **NUTR 291 Research**
  - Credits 0 to 4. 0 to 4 Other Hours.
  - Research conducted under the direction of faculty member in nutrition. May be repeated 2 times for credit.
  - Prerequisites: Freshman or sophomore classification and approval of department head.

- **NUTR 300/FSTC 300 Religious and Ethnic Foods**
  - Credits 3. 3 Lecture Hours.
  - Understanding religious and ethnic foods with application to product development, production, and nutritional practices; emphasis on different food rules and priorities with attention given to different religious and ethnic groups within the US and around the world.
- Prerequisites: Junior or senior classification or approval of instructor; basic knowledge of food science and nutrition helpful.
- Cross Listing: FSTC 300/NUTR 300.

- **NUTR 301 Nutrition Through Life**
  - Credits 3. 3 Lecture Hours.
  - Analysis of nutrition with emphasis on human biological needs through stages of the life cycle; biochemical, physiological and anthropometric aspects of nutrition.
  - Prerequisites: NUTR 203; junior classification or approval of department head.

- **NUTR 303/ANSC 303 Principles of Animal Nutrition**
  - Credits 3. 3 Lecture Hours.
  - Scientific approach to nutritional roles of water, carbohydrates, proteins, lipids, minerals, vitamins, and other dietary components; emphasis on the comparative aspects of gastrointestinal tracts and on digestion, absorption, and metabolism of nutrients.
  - Prerequisites: ANSC 107 and ANSC 108; CHEM 222 or CHEM 227 or equivalent.
  - Cross Listing: ANSC 303/NUTR 303.

- **NUTR 304 Food Service Systems Management**
  - Credits 4. 3 Lecture Hours. 3 Lab Hours.
  - Principles of food service management used in selecting, storing, preparing and serving food in quantity; emphasis on menu planning, quality control, purchasing, equipment and layout/design; application of basic food service systems management principles, including financial planning and personnel issues.
  - Prerequisites: NUTR 203 and NUTR 211, junior or senior classification.

- **NUTR 365 Nutritional Physiology of Vitamins and Minerals**
  - Credits 3. 3 Lecture Hours.
  - Fundamental nutritional significance of fat soluble and water soluble vitamins and minerals to human metabolism, cell biology and physiology; micro-nutrient groups as per metabolic function or biochemical and physiological actions; important dietary sources, absorption, storage, metabolism, (bio)chemistry, deficiency and toxicity of individual nutrients in this context and basis of DRIs.
  - Prerequisites: NUTR 203 and NUTR 301; junior or senior classification.

- **NUTR 404 Nutrition Assessment and Planning**
  - Credits 4. 3 Lecture Hours. 3 Lab Hours.
  - Methods of determining the nutritional status of individuals; dietary techniques; planning nutritional care including diet modification and/or nutrition support; nutrition counseling.
  - Prerequisites: NUTR 203; NUTR 301; junior classification or approval of department head.

- **NUTR 405 Nutritional Treatment of Disease**
  - Credits 3. 3 Lecture Hours.
  - Nutritional intervention in pathological conditions, based on biochemical, physiological and psychological effects of disease state; current research in clinical nutrition.
  - Prerequisites: NUTR 203, NUTR 444; BIOL 319; BICH 410 or concurrent enrollment; senior classification or approval of instructor.

- **NUTR 410/FSTC 410 Nutritional Pharmacometrics of Food Compounds**
  - Credits 3. 3 Lecture Hours.
  - Nutritional pharmacokinetics and pharmacodynamics of food compounds; specific examples of toxicological and pharmacological effects of food compounds.
  - Prerequisites: NUTR 202 or NUTR 203 or FSTC 201 or CHEM 222 or CHEM 227 or approval of instructor; junior or senior classification.
  - Cross Listing: FSTC 410/NUTR 410.

- **NUTR 430 Community Nutrition**
• Credits 3. 3 Lecture Hours.
• Health and nutrition programs, food labeling, cultural food practices, consumer education and marketing.
• Prerequisite: NUTR 203; NUTR 301; junior classification or approval of instructor.

• NUTR 440/FSTC 440 Therapeutic Microbiology: Probiotics and Related Strategies
  • Credits 3. 3 Lecture Hours.
  • Topics relevant to alimentary (gastrointestinal) microbiology including: (i) the “normal” intestinal microbiota; (ii) probiotic and prebiotic nutritional supplements; (iii) recombinant pharmabiotics; (iv) gut-associated lymphoid tissue and mucosal immunity; (v) foodborne gastrointestinal pathogens; and (vi) fermented products as functional foods.
  • Prerequisites: Undergraduate survey course in microbiology or approval of instructor; junior or senior classification.
  • Cross Listing: FSTC 440/NUTR 440.

• NUTR 450 Nutrition and Metabolism of Minerals
  • Credits 3. 3 Lecture Hours.
  • The role of minerals in living systems and the exploration of their multitude of functions; chemical properties of minerals and how that relates to function in cells and tissues; consequences of mineral deficiencies based on known functions; insight into experimental approaches used to assess minerals in a living environment.
  • Prerequisite: NUTR 203, BICH 303 or BICH 410 or approval of instructor.

• NUTR 469/FSTC 369 Experimental Nutrition and Food Science Laboratory
  • Credits 4. 1 Lecture Hour. 6 Lab Hours.
  • Investigation of nutritional intervention in animal models of metabolic and psychological disorders (e.g. obesity and depression); investigational approaches: behavioral analyses; RNA and protein analyses; reverse transcription PCR.
  • Prerequisites: CHEM 227; CHEM 237; junior or senior classification or approval of instructor.
  • Cross Listing: FSTC 369.

• NUTR 470 Nutrition and Physiological Chemistry
  • Credits 3. 3 Lecture Hours.
  • Fundamentals of physiology, biochemistry and nutrition and their relationship to the organismic and cellular metabolism of animals; biochemical basis of hormonal action.
  • Prerequisites: NUTR 203; NUTR 301; BICH 410; senior classification or approval of department head.

• NUTR 471/FSTC 471 Critical Eval. of Nutr and Food Science Lit.: Evidence Based Reviews
  • Credits 3. 3 Lecture Hours.
  • Evaluation of scientific literature, research methods within the literature, and the quality of scientific studies to produce an evidence-based review in areas specific to nutrition and food science.
  • Prerequisites: NUTR 202 or NUTR 203 and STAT 302; junior or senior classification; knowledge of technical writing helpful.
  • Cross Listing: FSTC 471/NUTR 471.

• NUTR 481 Seminar
  • Credit 1. 1 Lecture Hour.
  • Review of current literature and research in nutrition; oral presentations and critical discussions.
  • Prerequisite: NUTR 203; NUTR 301; senior classification or approval of department head.

• NUTR 485 Directed Studies
  • Credits 0 to 4. 0 to 4 Other Hours.
  • Directed study on selected problems in the area of nutrition.
  • Prerequisites: Junior or senior classification in scientific nutrition or allied area; approval of
• NUTR 489 Special Topics in...
  • Credits 1 to 4. 0 to 4 Lecture Hours. 0 to 4 Lab Hours.
  • Selected topics in an identified area of nutrition. May be repeated for credit.
  • Prerequisite: Approval of instructor; 2.0 GPR in major and overall.
• NUTR 491 Research
  • Credits 0 to 4. 0 to 4 Other Hours.
  • Research conducted under the direction of faculty member in nutrition. May be repeated 3 times for credit. Registration in multiple sections of this course are possible within a given semester provided that the per semester credit hour limit is not exceeded.

Courses for B.S. Food Science

• FSTC 201 Food Science
  • Credits 3. 3 Lecture Hours.
  • The fundamental biological, chemical and physical scientific principles associated with the study of foods; topics include food composition and nutrition, food additives and regulations, food safety and toxicology, food processing, food engineering, food Biotechnology, product development and sensory evaluation.
• FSTC 210/NUTR 210 Horizons in Nutrition and Food Science
  • Credits 2. 2 Lecture Hours.
  • Introduction to nutrition and food science career opportunities through presentations by nutrition and food science researchers and industry professionals; addresses issues of professionalism including portfolio development, teamwork, and critical thinking skills.
  • Cross Listing: NUTR 210/FSTC 210.
• FSTC 285 Directed Studies
  • Credits 0 to 4. 0 to 4 Other Hours.
  • Directed study of selected problems in the area of food science.
  • Prerequisites: Approval of instructor; 2.0 GPR in major and overall.
• FSTC 289 Special Topics in...
  • Credits 1 to 4. 1 to 4 Lecture Hours.
  • Special Topics in... Selected topics in an identified area of food science and technology. May be repeated for credit.
  • Prerequisite: Approval of instructor.
• FSTC 291 Research
  • Credits 0 to 4. 0 to 4 Other Hours.
  • Research conducted under the direction of faculty member in food science and technology. May be repeated 2 times for credit.
  • Prerequisites: Freshman or sophomore classification and approval of department head.
• FSTC 300/NUTR 300 Religious and Ethnic Foods
  • Credits 3. 3 Lecture Hours.
  • Understanding religious and ethnic foods with application to product development, production, and nutritional practices; emphasis on different food rules and priorities with attention given to different religious and ethnic groups within the US and around the world.
  • Prerequisites: Junior or senior classification or approval of instructor; basic knowledge of food science and nutrition helpful.
  • Cross Listing: NUTR 300/FSTC 300.
• FSTC 305 Fundamental Baking
  • Credits 3. 2 Lecture Hours. 3 Lab Hours.
• Fundamentals of baking; chemical and physical properties of ingredients, methods of baking all products, fundamental reactions of dough, fermentation and oven baking.
  • Prerequisite: CHEM 222 or 227 or approval of department head.

• FSTC 307/ANSC 307 Meats
  • Credits 3. 2 Lecture Hours. 3 Lab Hours.
  • Integrated studies of the meat animal processing sequence regarding the production of meat-type animals and the science and technology of their conversion to human food.
  • Prerequisites: ANSC 107 and 108 or approval of department head.
  • Cross Listing: ANSC 307/FSTC 307.

• FSTC 311/HORT 311 Principles of Food Processing
  • Credits 3. 2 Lecture Hours. 3 Lab Hours.
  • Principles and practices of canning, freezing, dehydration, pickling and specialty food manufacture; fundamental concepts of various techniques of preparation, processing, packaging and use of additives; processing plants visited.
  • Prerequisite: FSTC 201; junior or senior classification or approval of department head or instructor.
  • Cross Listing: HORT 311/FSTC 311.

• FSTC 312/DASC 312 Food Chemistry
  • Credits 3. 3 Lecture Hours.
  • The fundamental and relevant chemistry and functionality of the major food constituents (water, carbohydrates, lipids, proteins, phytochemical nutraceuticals) and study of food emulsion systems, acids, enzymes, gels, colors, flavors and toxins.
  • Prerequisite: FSTC 201; CHEM 227; CHEM 237 or approval of department head or instructor.
  • Cross Listing: DASC 312/FSTC 312.

• FSTC 313/DASC 313 Food Chemistry Laboratory
  • Credit 1. 3 Lab Hours.
  • Laboratory exercises investigating specific molecules, such as food acids, enzymes, pigments and flavors, and chemical interactions in foods, such as oxidation reactions, emulsion systems, and functional properties from a fundamental chemistry rather than an analytical perspective.
  • Prerequisite: FSTC 201; CHEM 227; CHEM 237 or approval of department head or instructor.
  • Cross Listing: DASC 313/FSTC 313.

• FSTC 314/DASC 314 Food Analysis
  • Credits 3. 1 Lecture Hour. 4 Lab Hours.
  • Selected standard methods for assay of food components; principles and methodology of both classical and instrumental techniques in food analysis.
  • Prerequisite: FSTC 201; FSTC 311/HORT 311; CHEM 227; CHEM 237 or approval of department head or instructor.
  • Cross Listing: DASC 314/FSTC 314.

• FSTC 315/AGSM 315 Food Process Engineering Technology
  • Credits 3. 2 Lecture Hours. 2 Lab Hours.
  • Elementary mechanics, power transmission, steam and steam boilers, pipes and pipe fitting, refrigeration and insulation, temperature measurement and control, electric motors, disposal of waste products, and mechanical problems as applied to foods and food processing.
  • Prerequisites: FSTC 201; PHYS 201; junior or senior classification or approval of instructor approval.
  • Cross Listing: AGSM 315/FSTC 315.

• FSTC 326/DASC 326 Food Bacteriology
  • Credits 3. 3 Lecture Hours.
  • Microbiology of human foods and accessory substances. Raw and processed foods; physical,
chemical and biological phases of spoilage. Standard industry techniques of inspection and control.

- Prerequisite: BIOL 206 or approval of instructor; junior or senior classification.
- Cross Listing: DASC 326/FSTC 326.

**FSTC 327/DASC 327 Food Bacteriology Lab**
- Credit 1. 3 Lab Hours.
- Laboratory to accompany FSTC 326/DASC 326.
- Cross Listing: DASC 327/FSTC 327.

**FSTC 330/DASC 330 Dairy and Food Technology**
- Credits 4. 3 Lecture Hours. 3 Lab Hours.
- Principles and practices involved in processing of milk into market milk, butter, cheese and cheese foods; fundamental principles of these processes as related to their design and control.
- Prerequisite: FSTC 330/DASC 330 or approval of department head.
- Cross Listing: DASC 330.

**FSTC 331/DASC 331 Dairy and Food Technology**
- Credits 4. 3 Lecture Hours. 3 Lab Hours.
- Manufacture of frozen, freeze-dehydrated, concentrated and dehydrated dairy foods; fundamental aspects of freezing, concentration and dehydration of foods.
- Prerequisite: FSTC 330/DASC 330 or approval of department head.
- Cross Listing: DASC 331.

**FSTC 401 Food Product Development**
- Credits 3. 2 Lecture Hours. 3 Lab Hours.
- Design and develop food products using principles of food chemistry, food processing, nutrition, sensory analysis and statistics; team collaborate to improve food product characteristics to meet the needs of a changing society.
- Prerequisites: FSTC 201, FSTC 311/HORT 311, FSTC 312/DASC 312, FSTC 313/DASC 313, FSTC 314/DASC 314, FSTC 315/AGSM 315, FSTC 326/DASC 326 or registration therein; senior classification or approval of instructor.

**FSTC 405/POSC 405 Egg and Poultry Meat Processing**
- Credits 3. 3 Lecture Hours.
- Principles of egg and poultry meat processing, understanding egg and poultry meat markets, egg and meat grading, product safety, packaging and consumer acceptance of shell eggs and poultry meat, specifically turkey and broilers.
- Prerequisites: Junior or senior classification or approval of instructor.
- Cross Listing: POSC 405/FSTC 405.

**FSTC 406/POSC 406 Poultry Further Processing**
- Credits 4. 3 Lecture Hours. 2 Lab Hours.
- Science and practice of value-added products; physical, chemical, microbiological and functional characteristics of value-added poultry products as they affect consumer acceptance, efficiency of production and regulatory approval.
- Prerequisites: CHEM 222; DASC 326/FSTC 326/FSTC 326/DASC 326; POSC 309; POSC 405/FSTC 405; junior or senior classification or approval of instructor.

**FSTC 410/NUTR 410 Nutritional Pharmacometrics of Food Compounds**
- Credits 3. 3 Lecture Hours.
- Nutritional pharmacokinetics and pharmacodynamics of food compounds; specific examples of toxicological and pharmacological effects of food compounds.
- Prerequisites: NUTR 202 or NUTR 203 or FSTC 201 or CHEM 222 or CHEM 227 or approval of instructor; junior or senior classification.
- Cross Listing: NUTR 410/FSTC 410.
• FSTC 440/NUTR 440 Therapeutic Microbiology: Probiotics and Related Strategies
  • Credits 3. 3 Lecture Hours.
  • Topics relevant to alimentary (gastrointestinal) microbiology including: (i) the “normal”
    intestinal microbiota; (ii) probiotic and prebiotic nutritional supplements; (iii) recombinant
    pharma/biotics; (iv) gut-associated lymphoid tissue and mucosal immunity; (v) foodborne
    gastrointestinal pathogens; and (vi) fermented products as functional foods.
  • Prerequisites: Undergraduate survey course in microbiology or approval of instructor; junior or
    senior classification.
  • Cross Listing: NUTR 440/FSTC 440.

• FSTC 444 Fundamentals of Food Law
  • Credits 3. 3 Lecture Hours.
  • History, development of, and fundamental principles behind current food regulations, including
    food labeling, adulteration, food safety, food additives, dietary supplements, and import and
    export laws; overview of government agency jurisdiction, international law and ethics.
  • Prerequisite: FSTC 201; junior or senior classification.

• FSTC 446/HORT 446 Commercial Fruit and Vegetable Processing
  • Credits 3. 2 Lecture Hours. 3 Lab Hours.
  • Pilot plant and laboratory operations pertaining to processed fruits, vegetables and beverages;
    new product development emphasized via individual laboratory projects.
  • Prerequisite: FSTC 311/HORT 311.
  • Cross Listing: HORT 446/FSTC 446. (Offered in even numbered years.)

• FSTC 457/ANSC 457 Hazard Analysis and Critical Control Point System
  • Credits 3. 3 Lecture Hours.
  • Hazard Analysis and Critical Control Point (HACCP) principles specifically related to meat and
    poultry; microbiological and process overviews; good manufacturing practices and standard
    operating procedures development.
  • Prerequisite: FSTC 326/DASC 326 or approval of instructor.
  • Cross Listing: ANSC 457/FSTC 457.

• FSTC 469/NUTR 369 Experimental Nutrition and Food Science Laboratory
  • Credits 4. 1 Lecture Hour. 6 Lab Hours.
  • Investigation of nutritional intervention in animal models of metabolic and psychological
    disorders (e.g. obesity and depression); investigational approaches: behavioral analyses; RNA and
    protein analyses; reverse transcription PCR.
  • Prerequisites: CHEM 227; CHEM 237; junior or senior classification or approval of instructor.
  • Cross Listing: NUTR 369.

• FSTC 471/NUTR 471 Critical Evaluation of Nutrition and Food Science Lit. Evidence Based Reviews
  • Credits 3. 3 Lecture Hours.
  • Evaluation of scientific literature, research methods within the literature, and the quality of
    scientific studies to produce an evidence-based review in areas specific to nutrition and food
    science.
  • Prerequisites: NUTR 202 or NUTR 203 and STAT 302; junior or senior classification; knowledge
    of technical writing helpful.
  • Cross Listing: NUTR 471/FSTC 471.

• FSTC 481 Seminar
  • Credit 1. 1 Lecture Hour.
  • Guidelines and practice in journal article review and making effective technical presentations;
    strategies for conducting a job search; development of résumés and letters and interviewing
    targeted for careers in the food industry or graduate school.
  • Prerequisite: Senior classification in food science and technology.
• FSTC 485 Directed Studies
  • Credits 0 to 4. 0 to 4 Other Hours.
  • Directed study on selected problems in the area of food technology not covered in other courses.
  • Prerequisites: Junior or senior classification; approval of department head; 2.0 GPR in major and overall.

• FSTC 487/ANSC 487 Sensory Evaluation of Foods
  • Credits 3. 2 Lecture Hours. 2 Lab Hours.
  • Application of sensory science principles and practices to food systems including an understanding of discriminative, descriptive and consumer sensory techniques;
  • Prerequisites: CHEM 222 or CHEM 228; junior or senior classification.
  • Cross Listing: ANSC 487/FSTC 487.

• FSTC 489 Special Topics in...
  • Credits 1 to 4. 1 to 4 Lecture Hours.
  • Selected topics in an identified area of food science and technology. May be repeated for credit.

• FSTC 491 Research
  • Credits 0 to 4. 0 to 4 Other Hours.
  • Research conducted under the direction of faculty member in food science and technology. May be repeated 3 times for credit. Registration in multiple sections of this course are possible within a given semester provided that the per semester credit hour limit is not exceeded.

Courses for Graduate Degrees in Nutrition

• NUTR 601/ANSC 601 General Animal Nutrition
  • Credits 3. 3 Lecture Hours.
  • Comparative nutrition of animal species contrasting digestive, metabolic and physiological functions involved in processing and using nutrients.
  • Prerequisite: ANSC 303 or 318 or equivalent.
  • Cross Listing: ANSC 601/NUTR 601.

• NUTR 602/ANSC 602 Energetics of Metabolism and Growth
  • Credits 3. 3 Lecture Hours.
  • Current fundamental concepts in protein and energy metabolism relating to nutrients required for maintenance, growth and development of animals.
  • Prerequisite: BICH 410 or approval of instructor.
  • Cross Listing: ANSC 602/NUTR 602.

• NUTR 610/FSTC 610 Nutritional Pharmacometrics of Food Compounds
  • Credits 3. 3 Lecture Hours.
  • Introduction into nutritional pharmacokinetics and pharmacodynamics of food compounds; specific examples of toxicological and pharmacological effects of food compounds.
  • Prerequisite: NUTR 202 or NUTR 203 or FSTC 201 or CHEM 227 or CHEM 222 or approval of instructor.
  • Cross Listing: FSTC 610/NUTR 610.

• NUTR 613/ANSC 613 Protein Metabolism
  • Credits 3. 3 Lecture Hours.
  • Basic concepts and recent advances in protein metabolism in animals with emphasis on physiological and nutritional significances; discussion of protein digestion; absorption of peptides; absorption, synthesis and degradation of amino acids; hormonal and nutritional regulation of protein turnover; determination of protein quality and requirements.
  • Prerequisite: BICH 411 or BICH 601 or equivalent or approval of instructor.
  • Cross Listing: ANSC 613/NUTR 613.
• NUTR 614 Fermentation and Gastrointestinal Microbiology
  • Credits 3. 3 Lecture Hours.
  • Fermentation and gastrointestinal ecosystems in terms of microorganisms present, their activities and requirements and their interactions in a dynamic system.
  • Prerequisite: Beginning microbiology and/or biochemistry or approval of instructor.
  • Cross Listing: POSC 614 and VTMI 614.

• NUTR 617/ANSC 617 Experimental Techniques in Meat Science
  • Credits 3. 1 Lecture Hour. 6 Lab Hours.
  • Methods used in separating and identifying muscle proteins and fats; techniques for determining postmortem changes of muscle tissue as a result of antemortem treatments.
  • Prerequisite: ANSC 607/FSTC 607; BICH 411.
  • Cross Listing: ANSC 617/NUTR 617.

• NUTR 618/ANSC 618 Lipids and Lipid Metabolism
  • Credits 3. 3 Lecture Hours.
  • Chemical nature of various classes of lipids and lipid-derived hormones; absorption and metabolism of fatty-acids and lipids; regulation of lipid biosynthesis and obesity; relationship between lipid metabolism and cholesterol homeostasis; lipids as hormones.
  • Prerequisite: BICH 410 or approval of instructor.
  • Cross Listing: ANSC 618/NUTR 618.

• NUTR 630 Nutrition in Disease
  • Credits 3. 3 Lecture Hours.
  • Human nutritional requirements in health and disease, emphasizing effects of disease states on intake, digestion, absorption, metabolism and excretion of nutrients; relationship of diet to development of certain diseases.
  • Prerequisites: NUTR 202; BICH 410 or equivalent.

• NUTR 640/FSTC 640 Therapeutic Microbiology I
  • Credits 3. 3 Lecture Hours.
  • Alimentary (gastrointestinal) microbiology including: (i) the “normal” intestinal microbiota; (ii) probiotic and prebiotic nutritional supplements; (iii) recombinant pharmabiotics; (iv) gut-associated lymphoid tissue and mucosal immunity; (v) foodborne gastrointestinal pathogens; and (vi) fermented products as functional foods.
  • Prerequisite: Undergraduate survey course in microbiology (or instructor’s consent).
  • Cross Listing: FSTC 640/NUTR 640.

• NUTR 641 Nutritional Biochemistry I
  • Credits 3. 3 Lecture Hours.
  • Integration of the intermediary metabolism of glucose, amino acids and lipids with nutrition, physiology and pathophysiology in animals; regulation of metabolic pathways in cells, tissues and the whole body under normal and disease conditions; functions of vitamins and minerals in nutrient metabolism and health.
  • Prerequisite: BICH 411 or BICH 604. Offered during the fall semester.

• NUTR 642 Nutritional Biochemistry II
  • Credits 3. 3 Lecture Hours.
  • Mechanisms through which specific nutrients modulate intracellular signal transduction and gene expression; molecular mechanisms by which nutrition modulates disease states such as atherosclerosis, cancer and arthritis.
  • Prerequisites: BICH 411; BICH 431/GENE 431 or equivalent.

• NUTR 645/POSC 645 Nutrition and Metabolism of Vitamins
  • Credits 3. 3 Lecture Hours.
  • Chemistry and metabolism of the fat soluble and water soluble vitamins and their roles in
animals; integrates cellular biochemistry and metabolism of the vitamins in vertebrate animal.

- **Prerequisites:** POSC 411 or ANSC 303/NUTR 303; BICH 410 or BICH 603.
- **Cross Listing:** POSC 645/NUTR 645.

- **NUTR 646 Fundamentals of Space Life Sciences**
  - **Credits 3.** 3 Lecture Hours.
  - Integrates nutrition, physiology, and radiation biology to define major biological problems in long duration space flight; provide an overview of the problems of bone loss, muscle wasting, and radiation-enhanced carcinogenesis along with potential countermeasures; focus on nutritional interventions and exercise protocols.
  - **Cross Listing:** NUEN 646 and KINE 646.

- **NUTR 647/WFSC 647 Nutritional Biochemistry of Fishes**
  - **Credits 3.** 3 Lecture Hours.
  - Principles of nutritional biochemistry including nutrient metabolism and biochemical energetics with special emphasis on finfish and shellfish.
  - **Prerequisite:** BICH 410 or equivalent.
  - **Cross Listing:** WFSC 647/NUTR 647.

- **NUTR 650/POSC 650 Nutrition and Metabolism of Minerals**
  - **Credits 3.** 3 Lecture Hours.
  - Nutritional significance of minerals in animal metabolism; chemical, biochemical and physiological role of minerals and homeostatic control in animal metabolism.
  - **Prerequisites:** POSC 411 or ANSC 303/NUTR 303; BICH 410 or BICH 603.
  - **Cross Listing:** POSC 650/NUTR 650.

- **NUTR 669/FSTC 669 Experimental Nutrition & Food Science Laboratory**
  - **Credits 4.** 1 Lecture Hour. 6 Lab Hours.
  - Experimental Nutrition & Food Science Laboratory. Nutritional intervention in animal models of metabolic or emotional disorders; genetic modifications or pathogens in food products; analyses of gene expression and behavior.
  - **Prerequisite:** BICH 432/GENE 432/GENE 432/BICH 432 recommended; graduate classification in nutrition or related major.
  - **Cross Listing:** FSTC 669/NUTR 669.

- **NUTR 671/FSTC 671 Crit Eval of Nutr and Food Science Lit: Evidence Based Reviews**
  - **Credits 3.** 3 Lecture Hours.
  - Evaluation of scientific literature, research methods within the literature, and the quality of scientific studies to produce an evidence-based review in areas specific to nutrition and food science.
  - **Prerequisites:** NUTR 202 or NUTR 203 and STAT 302; knowledge of nutrition, statistics, and technical writing helpful.
  - **Cross Listing:** FSTC 671/NUTR 671.

- **NUTR 681 Seminar**
  - **Credit 1.** 1 Lecture Hour.
  - Current developments in the field of nutrition; review of current literature and oral presentation of scientific papers on selected nutrition topics.
  - **Prerequisite:** Graduate classification.

- **NUTR 684 Professional Internship**
  - **Credits 1 to 16.** 1 to 16 Other Hours.
  - Experience in application of formal training to applied nutrition under supervision of nutritionists, dietitians and faculty member. Student will investigate matter of mutual interest and report results in a professional paper approved by the graduate committee.
  - **Prerequisite:** Graduate classification.
• NUTR 685 Directed Studies
  • Credits 1 to 4. 1 to 4 Other Hours.
  • Nutrition problems and procedures; problems assigned according to experience, interest and need of individual student.
  • Prerequisite: Approval of instructor prior to registration.

• NUTR 689 Special Topics in...
  • Credits 1 to 4. 0 to 4 Lecture Hours. 0 to 4 Lab Hours.
  • Special topics in an identified area of nutrition. May be repeated for credit.
  • Prerequisites: Graduate classification and approval of instructor.

• NUTR 691 Research
  • Credits 1 to 23. 1 to 23 Other Hours.
  • Investigations leading to thesis or dissertation in various areas of nutrition.
  • Prerequisite: Graduate classification.

Courses for Graduate Degrees in Food Science and Technology
• FSTC 605 Chemistry of Foods
  • Credits 3. 3 Lecture Hours.
  • Chemical covalent and noncovalent interactions in food systems; the glass transition and moisture in foods; carbohydrate chemistry; reactions of food lipids; food protein functionality; chemistry of flavor; processing chemistry; food additives; and nutraceutical phytochemicals.
  • Prerequisite: BICH 410 or BICH 603.

• FSTC 606/DASC 606 Microbiology of Foods
  • Credits 3. 3 Lecture Hours.
  • Nature and function of beneficial and defect-producing bacteria in foods; food-borne illness, effects of processing, storage and distribution; techniques for isolation and identification from foods.
  • Cross Listing: DASC 606/FSTC 606.

• FSTC 607/ANSC 607 Physiology and Biochemistry of Muscle as a Food
  • Credits 3. 3 Lecture Hours.
  • Biochemical, histological, anatomical and physical characteristics of muscle cells and factors associated with transformation of muscle cells into meat.
  • Prerequisite: BICH 410 or approval of department head.
  • Cross Listing: ANSC 607/FSTC 607.

• FSTC 610/NUTR 610 Nutritional Pharmacometrics of Food Compounds
  • Credits 3. 3 Lecture Hours.
  • Introduction into nutritional pharmacokinetics and pharmacodynamics of food compounds; specific examples of toxicological and pharmacological effects of food compounds.
  • Prerequisite: NUTR 202 or NUTR 203 or FSTC 201 or CHEM 227 or CHEM 222 or instructor approval.
  • Cross Listing: NUTR 610/FSTC 610.

• FSTC 611/POSC 611 Poultry Further Processing
  • Credits 3. 3 Lecture Hours.
  • Egg and poultry meat processing; egg markets, egg processing, grading, packaging, safety, quality and consumer acceptance of shell eggs; poultry meat processing (specifically turkey and broilers), meat quality, markets, consumer acceptance of poultry meat and safety.
  • Cross Listing: POSC 611/FSTC 611.

• FSTC 619 Molecular Methods for Microbial Characterization
  • Credits 3. 2 Lecture Hours. 2 Lab Hours.
  • Underlying principles of molecular methods for microbial detection and characterization in
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natural and man-made ecosystems; emphasis on method application and data interpretation; emphasis on microbial pathogens and indicator organisms in foods and environment; laboratory covers select protocols.

- Prerequisites: FSTC 326/DASC 326; SCSC 405; POSC 429; approval of instructor.
- Cross Listing: SCSC 619, POSC 619, and VTMI 619.

- **FSTC 629/POSC 629 Microbiology of Food Irradiation**
  - Credits 3. 2 Lecture Hours. 2 Lab Hours.
  - Lecture plus laboratory overview of electron beam and x-ray based food irradiation principles; provides a working knowledge of using electronic pasteurization as a means of destroying microbial pathogens or retarding microbial spoilage in foods.
  - Cross Listing: POSC 629/FSTC 629.

- **FSTC 630/SCSC 630 Cereal Grains for Human Food**
  - Credits 4. 3 Lecture Hours. 3 Lab Hours.
  - Fundamental concepts of dry milling, wet milling, oil extraction, baking, malting, brewing, storage, sanitation and quality evaluation and control interrelated with physical and biochemical properties of cereals and their products; use of instruments and techniques to evaluate cereal quality.
  - Prerequisite: Approval of instructor.
  - Cross Listing: SCSC 630/FSTC 630.

- **FSTC 631 Food Carbohydrates**
  - Credits 3. 3 Lecture Hours.
  - Chemistry, structure, functionality and nutritional properties of food carbohydrates; fiber chemistry, functionality and nutritional properties, artificial sweeteners, starch structure and functionality and hydrocolloid functionality.
  - Prerequisite: BICH 410. (Offered in alternate years.)

- **FSTC 634 Oilseed Proteins for Foods**
  - Credits 3. 3 Lecture Hours.
  - World production, composition, processing technologies, uses of products (oil, meal, protein concentrates and isolates, and texturized products) in feeds and foods; present and potential food applications of oilseed proteins.
  - Prerequisites: CHEM 228 and CHEM 317. (Offered in alternate years.)

- **FSTC 635 Oil and Fat Food Products**
  - Credits 3. 3 Lecture Hours.
  - Composition, properties and reactions; sources, handling and storage of raw materials; extraction refining and bleaching; hydrogenation, deodorization, esterification and interesterification; fractionation; uses in salad oils, shortening, margarine, bakery products and other foods.
  - Prerequisites: CHEM 228 and CHEM 317. (Offered in alternate years.)

- **FSTC 640/NUTR 640 Therapeutic Microbiology I**
  - Credits 3. 3 Lecture Hours.
  - Alimentary (gastrointestinal) microbiology including: (i) the “normal” intestinal microbiota; (ii) probiotic and prebiotic nutritional supplements; (iii) recombinant pharmabiotics; (iv) gut-associated lymphoid tissue and mucosal immunity; (v) foodborne gastrointestinal pathogens; and (vi) fermented products as functional foods.
  - Prerequisite: Undergraduate survey course in microbiology (or instructor’s consent).
  - Cross Listing: NUTR 640/FSTC 640.

- **FSTC 644 Disease Mechanisms of Foodborne Pathogens**
  - Credits 3. 3 Lecture Hours.
  - Principles of pathogenicity of foodborne bacteria; mechanisms used by disease-causing bacteria leading to human illness; basic principles of immunology and human and bacterial physiology;
• Investigation of bacterial virulence factors and effects of stress response, quorum sensing and other external factors.
  • Prerequisite: FSTC 326/DASC 326 or BIOL 351, or approval of instructor.

• FSTC 647/ANSC 647 Technology of Meat Processing and Distribution
  • Credits 3.3 Lecture Hours.
  • Quantitative and qualitative characteristics of meat and meat products as related to food technology processing operations; manufacturing, preservation, packaging and merchandising.
  • Cross Listing: ANSC 647/FSTC 647.

• FSTC 657/ANSC 657 Hazard Analysis and Critical Control Point System
  • Credits 3.3 Lecture Hours.
  • Examination of the Hazard Analysis and Critical Control Point (HACCP) principles specifically related to meat and poultry; microbiological and process overviews; good manufacturing practices (GMP) and standard operating procedures (SOP) development; team-building and implementation into industry operations. This class is designed for the production of food and fulfills the training requirements of USDA’s HACCP regulation for meat and poultry (9 CFR Part 417), and FDA’s HACCP regulations for fish and fishery products (21 CFR Part 123 and 1240) and for juice (21 CFR Part 120).
  • Cross Listing: ANSC 657/FSTC 657.

• FSTC 667/ANSC 667 Industrial Processed Meat Operations
  • Credits 3.2 Lecture Hours. 2 Lab Hours.
  • Application of scientific principles and business practices to manufactured meat products; interrelationships among marketing, manufacturing, product development, regulatory compliance and quality assurance in commercial processed meat operations.
  • Prerequisite: Approval of instructor.
  • Cross Listing: ANSC 667/FSTC 667.

• FSTC 669/NUTR 669 Experimental Nutrition & Food Science Laboratory
  • Credits 4.1 Lecture Hour. 6 Lab Hours.
  • Experimental Nutrition & Food Science Laboratory. Nutritional intervention in animal models of metabolic or emotional disorders; genetic modifications or pathogens in food products; analyses of gene expression and behavior.
  • Prerequisite: BICH 432/GENE 432/GENE 432/BICH 432 recommended; graduate in nutrition or related major.
  • Cross Listing: NUTR 669/FSTC 669.

• FSTC 671/NUTR 671 Crit Eval of Nutr and Food Science Lit: Evidence Based Reviews
  • Credits 3.3 Lecture Hours.
  • Evaluation of scientific literature, research methods within the literature, and the quality of scientific studies to produce an evidence-based review in areas specific to nutrition and food science.
  • Prerequisites: NUTR 202 or NUTR 203 and STAT 302; knowledge of nutrition, statistics, and technical writing helpful.
  • Cross Listing: NUTR 671/FSTC 671.

• FSTC 681 Seminar
  • Credit 1.1 Lecture Hour.
  • Oral reports and discussions of current research and developments in food technology designed to broaden understanding of problems and to stimulate research.

• FSTC 684 Professional Internship
  • Credits 1 to 16. 1 to 16 Other Hours.
  • Experience in application of formal training to a commercial operation under supervision of operations manager and designated faculty member. Student will investigate matter of mutual
interest and report results in a professional paper approved by the graduate committee.

- **FSTC 685 Directed Studies**
  - Credits 1 to 4. 1 to 4 Other Hours.
  - Directed study of selected problems emphasizing recent developments in research techniques.

- **FSTC 687/ANSC 687 Sensory Evaluation of Foods**
  - Credits 3. 2 Lecture Hours. 1 Lab Hour.
  - Application of sensory science principles and practices to food systems including an understanding of discriminative, descriptive and consumer sensory techniques.
  - Prerequisite: CHEM 222 or CHEM 228.
  - Cross Listing: ANSC 687/FSTC 687.

- **FSTC 689 Special Topics in...**
  - Credits 1 to 4. 1 to 4 Lecture Hours. 0 to 4 Lab Hours.
  - Special topics in an identified area of food science and technology. May be repeated for credit.

- **FSTC 691 Research**
  - Credits 1 to 23. 1 to 23 Other Hours.
  - Investigations leading to thesis or dissertation in various areas of food science and technology.

- **FSTC 697/ANSC 697 Applied Microbiology for Foods of Animal Origin: Processing, Sanitation and Sanitary Design**
  - Credits 3. 3 Lecture Hours.
  - Application of basic food microbiology knowledge and principles to food production processes and products; sources of microbiological contamination and their impact on food safety and spoilage; application of sanitary design and validation; testing and auditing to monitor and trouble-shoot the process.
  - Prerequisites: DASC/FSTC 326/DASC 326 or FSTC 606/DASC 606 or equivalent.
  - Cross Listing: ANSC 697/FSTC 697.
Graduate Admission Criteria

The Department of Nutrition and Food Science reviews prospective student applications biannually for both fall, spring, and summer admissions, but we have a standing Admissions Committee for both Nutrition and Food Science. Applications to the graduate program are accepted by August 1 for spring entry and March 1 for fall entry. Prospective students can apply after these deadlines and still be admitted if spaces are still available. Domestic students can be admitted as late as the week that classes start. International students must allow enough time for application processing and visa processing which takes 6 weeks or more. All applicants are reviewed for minimal requirements by either the NUTR or FSTC graduate admissions committee, and acceptable applicants are forwarded for admission procedures. The graduate program admits 4 categories of students: M.S. students, M. Ag. students, PhD students who enter with only a BS degree (96-hr program) and PhD students who enter with an MS degree (64-hr program). Prospective students are encouraged to write a statement of purpose that reflects their interest in the program including curricular or research interests. Applications are initially reviewed by the graduate program coordinator before being sent out for committee or faculty review. When reviewing applications for MS and PhD studies the faculty considers the whole application including GRE scores, GPR, coursework, letters of recommendation, and other evidence of scholarly work.

The department typically receives large numbers of graduate applications. For the fall 2015 admissions period the department received 171 applications, including 120 food science and 51 nutrition applications of which 78% were international applicants. The department typically accepts from 8-15 percent of applicants, making it a very competitive process. The average scores for admitted students for the falls of 2013 through 2015 are a 306 GRE and 3.50 GPA.

The basic requirement for admission to masters or doctoral graduate studies in the Department of Nutrition and Food Science is a scholastic record which, over at least the last two years of full-time academic study in a degree program, gives evidence of the applicant’s ability to do successful graduate-level work. Specific requirements for admission into the Nutrition and Food Science graduate program include a minimum grade point average of 3.0 (on a 4.0 scale) on the most recently earned degree and three strong letters of recommendation. Applicants are considered competitive with a score of at least 300 (combined Verbal and Quantitative scores) on the Graduate Record Examination (GRE). For International Students whose native language is not English, the Test of English as a Foreign Language (TOEFL) is also required, with a minimum score of 550 (Paper based), 213 (Computer based), or 80 (Internet based).

Required Materials for a Complete Application:

- Apply Texas online application
- Personal Statement
- Transcripts
- GRE scores
- TOEFL scores (if International)
- 3 Letters of Recommendation
- Application Fee
- Resume/CV (not required, but recommended)

Members of the graduate faculty can access applicant files, but faculty are notified periodically (usually quarterly) when applicants are available for review. However, doctoral students are usually individually recruited by faculty. When a faculty-student match has been agreed to, the faculty member will fill out a “Graduate Application Response Form” that is a written agreement to accept the student and serve as the major advisor with or without funding. Forms are approved by the Associate Department Head of Academics and the application forwarded to University admissions for processing and official notification to the student.
## Student Applications, Admissions, and Enrollment (Current and Past 5 years)

### Applied, Admitted, and Enrolled NFSC Students for 2015

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### GRE Scores of Graduate Applicants

**GRE Score for First Time Graduate Students NFSC (past 5 years)**

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<td></td>
<td></td>
</tr>
<tr>
<td>NUTR</td>
<td>Spring</td>
<td>2013</td>
<td>2</td>
<td>308</td>
<td>305</td>
<td>312</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FSTC</td>
<td>Fall</td>
<td>2013</td>
<td>10</td>
<td>305</td>
<td>925</td>
<td>980</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NUTR</td>
<td>Fall</td>
<td>2013</td>
<td>8</td>
<td>306</td>
<td>1445</td>
<td>1500</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FSTC</td>
<td>Spring</td>
<td>2014</td>
<td>4</td>
<td>303</td>
<td>840</td>
<td>840</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>FSTC</td>
<td>Fall</td>
<td>2014</td>
<td>4</td>
<td>315</td>
<td>314</td>
<td>318</td>
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<tr>
<td>NUTR</td>
<td>Fall</td>
<td>2014</td>
<td>4</td>
<td>302</td>
<td>295</td>
<td>307</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Number of Graduate Degrees Awarded

**Number of degrees awarded per year (past 5 years)**

<table>
<thead>
<tr>
<th>Year</th>
<th>NUTR B.S.</th>
<th>NUTR M.S.</th>
<th>NUTR Ph.D.</th>
<th>FSTC B.S.</th>
<th>FSTC M.Ag.</th>
<th>FSTC M.S.</th>
<th>FSTC Ph.D.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>125</td>
<td>14</td>
<td>5</td>
<td>43</td>
<td>0</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>2012</td>
<td>112</td>
<td>7</td>
<td>6</td>
<td>44</td>
<td>0</td>
<td>7</td>
<td>2</td>
</tr>
<tr>
<td>2013</td>
<td>128</td>
<td>6</td>
<td>3</td>
<td>44</td>
<td>0</td>
<td>15</td>
<td>3</td>
</tr>
<tr>
<td>2014</td>
<td>127</td>
<td>10</td>
<td>0</td>
<td>44</td>
<td>0</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>2015</td>
<td>n/a</td>
<td>9</td>
<td>2</td>
<td>n/a</td>
<td>0</td>
<td>6</td>
<td>2</td>
</tr>
</tbody>
</table>
Average Time to Degree

Average time to degree (past 5 years)

<table>
<thead>
<tr>
<th>Dates</th>
<th>B.S.</th>
<th>M.S.</th>
<th>Ph.D.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NUTR</td>
<td>FSTC</td>
<td>NUTR</td>
</tr>
<tr>
<td>2009-10</td>
<td>4.34</td>
<td>4.64</td>
<td>2.00</td>
</tr>
<tr>
<td>2010-11</td>
<td>4.46</td>
<td>4.60</td>
<td>2.58</td>
</tr>
<tr>
<td>2011-12</td>
<td>4.33</td>
<td>4.72</td>
<td>2.50</td>
</tr>
<tr>
<td>2012-13</td>
<td>4.45</td>
<td>4.61</td>
<td>4.17</td>
</tr>
<tr>
<td>2013-14</td>
<td>4.41</td>
<td>4.84</td>
<td>3.00</td>
</tr>
<tr>
<td>2014-2015</td>
<td>4.41</td>
<td>4.73</td>
<td>2.93</td>
</tr>
<tr>
<td>Average</td>
<td>4.40</td>
<td>4.69</td>
<td>2.86</td>
</tr>
</tbody>
</table>

Academic Enhancements

Both graduates and undergraduates have numerous opportunities for high-impact learning opportunities within the department, College, and Texas A&M University.

- NUTR/FSTC 485/685. Special Topics courses and research opportunities.
- NUTR/FSTC 491/691. Directed Research in faculty laboratories.
- NUTR/FSTC 484/684. Professional Internships with food and nutritional companies.
- Study Abroad Programs (Italy and Brazil in the NFSC department)

Assessment of Student Learning Outcomes: Nutrition and Food Science and Technology

The NSFC Graduate Assessment Committee was formed in 2011-2012 and later merged with the NFSC Undergraduate Assessment Committee in the spring 2015. This merger was intended to strengthen the graduate assessment program since the undergraduate committee had been in existence for the past five years and existing members had a broad knowledge of assessment. Additionally, some of the same assessment issues and concerns existed for both committees and this created synergy of effort. Eventually, the graduate programs in NUTR and FSTC will be assessed separately. Active assessment of our graduate programs is relatively new and Problem Solving and Critical Thinking skills were united as one goal with common assessment. Outcomes indicated that 88% of graduate students (N=32) demonstrated the ability to analyze and integrate information, with a target of 90%. Critical Thinking is a common concern of both graduate and undergraduate programs and faculty will collaborate to identify tools for a more deliberate discussion of critical thinking throughout the graduate education process including open-forums on Critical Thinking and Problem Solving conducted in Fall of 2015. Increased faculty discussion and sharing ideas on current strategies being used in the classroom including dialogues with the Center for Teaching Excellence on the implementation of Critical Thinking assignments will benefit both faculty and students. Assessment includes:

- Use a communication rubric in early graduate courses to assess a baseline of students communication skills
- Evaluate communication during their final defense
- Offer funding for students to present their research at scientific conferences/symposia
- Increase faculty awareness of the importance of effective communication.
Assessment of Undergraduate Program: Nutritional Sciences

Several steps have been made to improve the NUTR assessment plans following a comprehensive curriculum review in 2011-2012 whereby faculty began to organize for better assessment of our courses and effectiveness of our instruction. The major action plan update from the 2012 assessment cycle was the development of standardized course-level assessment rubrics that were implemented in spring 2013 for select nutrition courses and in 2013 to move to 2-year collection cycles. Intentional effort was also made to involve all faculty members in the assessment process by inclusion in the development of the action plan to address unmet achievement targets. Gaining more faculty input and “buy-in” was intended to improve effectiveness of the overall assessment process.

The NUTR students have been consistently successful in oral communication skills, but not in written communication. Therefore, the NFSC Assessment Committee proposed to modify the achievement target to 80% as a more realistic goal, and then work to increase the rigor of this goal. The action plan was two-part: first to promote the University Writing Center (UWC) as a resource for our undergraduates and second to require all nutrition students to take NUTR 210 Horizons in Nutrition and Food Science as part of their core courses. Students have a group research written semester project that is intended to enhance written communication skills. The faculty also developed a new course (NUTR 289/204 - Current Perspectives in Nutrition) as a recitation course to introduce technical writing earlier in the program in attempt to enhance written communication skills. In time, we expect overall written communication skills to significantly improve.

The latest assessment efforts have been aimed at technical knowledge, critical thinking, and personal and social responsibility during direct and indirect measures. NUTR faculty members developed and implemented an action plan that includes:

- Appropriate usage of assignments in course instruction requiring applied knowledge and critical thinking skills
- Increased faculty discussion and sharing of ideas on current strategies being used in the classroom
- Offering faculty training on the implementation of critical thinking assignments from the Center for Teaching Excellence (CTE)
- Implementation of NUTR 289/204 writing intensive course that will enhance critical thinking and written communication skills.
- Offer faculty training on the implementation of critical thinking assignments
- Enhance faculty dialogues and interaction to promote critical thinking and technical knowledge strategies and help to more accurately identify our outside training requirements.

To help stream-line our aggressive assessment protocols, faculty also voted to reduce the number of goals that we collect data and focus on their achievement by setting targets to be that 80% of the students will score 80% or better on an identified goal. As a result of this discussion, we eliminated teamwork/collaboration and personal and social responsibility as program goals and rather focused on achieving goals for critical thinking, technical knowledge, communication skills and lifelong learning. We hope to work to accomplish this level of achievement and then revise these goals upward. A major weakness of the NUTR program and underlying problem with Critical Thinking skills is that only 9% of undergraduate students participated in faculty research activities, experiential learning opportunities, study abroad and/or corporate internships to expand their career interests. This value is deceptive however, due to the large number of undergraduates in the program.
### Program Goal

**Goal #1** – Undergraduates will demonstrate effective written and oral communication skills. (Data Collected - 2015-2017; Reported – 2016-2017)

<table>
<thead>
<tr>
<th>Achievement Targets</th>
<th>Data Assessed</th>
<th>Assessment Method</th>
<th>Assessed by:</th>
<th>Action Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>80% of students will demonstrate effective oral and written communication skills by scoring &gt;80% on identified assignments.</td>
<td>Proposed courses with assignments for assessment NUTR 430 – W course NUTR 481 – C course</td>
<td>Rubric evaluation of identified assignments</td>
<td>Course instructors</td>
<td>Obtain data each semester course is taught</td>
</tr>
<tr>
<td>90% of graduating seniors will agree that the Nutrition curriculum promoted effective written and oral communication skills.</td>
<td>Senior survey responses</td>
<td>Survey undergraduates in senior level courses</td>
<td>Administered by Associate DH</td>
<td>Administered in 481</td>
</tr>
<tr>
<td>90% of former students will agree that the Nutrition curriculum enhanced their written and oral communication skills.</td>
<td>Former student survey Responses</td>
<td>Survey 1-4 year out graduates</td>
<td>Former student surveys; Undergraduate assessment coordinator; % favorable responses</td>
<td>Compile data annually; determine % of favorable responses</td>
</tr>
<tr>
<td>90% of supervisors/employers will agree that graduates have effective written and oral communication skills.</td>
<td>Supervisor/employer survey responses</td>
<td>Survey supervisors/employers of 1-4 year out graduates</td>
<td>Supervisor/employer surveys; Undergraduate assessment coordinator; % favorable responses</td>
<td>Compile data annually; determine % of favorable responses</td>
</tr>
</tbody>
</table>

Program Goal

Goal #2 Undergraduates will be prepared with skills to engage in lifelong learning through participation in faculty research activities, experiential learning opportunities and/or corporate internships to refine their career interests, learn essential research skills, and promote inquisitiveness and independent thought.

<table>
<thead>
<tr>
<th>Achievement Targets</th>
<th>Data Assessed</th>
<th>Assessment Method</th>
<th>Assessed by:</th>
<th>Action Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>10% undergraduate students will participate in faculty research activities, experiential learning opportunities, study abroad, and/or corporate internships to expand their career interests</td>
<td>Departmental records of student enrollment in NUTR 285, 291, 485, and 491 experiential learning opportunities and internships</td>
<td>Review records that provide relevant data.</td>
<td>Departmental advisors</td>
<td>Compile and evaluate enrollment &amp; participation</td>
</tr>
<tr>
<td>90% of graduating seniors agree that research activities, literature reviews, case studies, etc. enhanced their educational experience</td>
<td>Senior survey responses</td>
<td>Survey undergraduates in senior level courses</td>
<td>Administered by Associate DH</td>
<td>Administered in 481</td>
</tr>
<tr>
<td>90% of former students agree that the Nutrition curriculum encouraged inquisitiveness and independent thought through research activities, literature reviews, case studies, etc.</td>
<td>Former student survey responses</td>
<td>Survey 1-4 year out graduates</td>
<td>Former student surveys; Undergraduate assessment coordinator; % favorable responses</td>
<td>Compile data annually; determine % of favorable responses</td>
</tr>
<tr>
<td>90% of employers/supervisors agree that former students display inquisitiveness and independent thought</td>
<td>Supervisor/employer survey responses</td>
<td>Survey supervisors/employers of 1-4 year out graduates</td>
<td>Supervisor/employer surveys; Undergraduate assessment coordinator; % favorable responses</td>
<td>Compile data annually; determine % of favorable responses</td>
</tr>
</tbody>
</table>

Goal #2 Measures: Departmental Data, Graduating Senior Survey (TAMU), Former Student Surveys, Employer/Supervisor Surveys
<table>
<thead>
<tr>
<th>Program Goal</th>
<th>Achievement Target</th>
<th>Action Plan</th>
<th>Assessment Method</th>
<th>Data Assessed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goal #3: Undergraduates will demonstrate technical knowledge required for a BS in Nutritional Science</td>
<td>80% of students will display technical knowledge skills by scoring &gt;80% on identified assignments.</td>
<td>Obtain and evaluate data each semester</td>
<td>Course instructors</td>
<td>Proposed courses with assignments for assessment: NUTR 203, NUTR 301, NUTR 470</td>
</tr>
<tr>
<td></td>
<td>90% of graduating seniors will agree that the Nutrition curriculum provided sound technical knowledge.</td>
<td>Administered in 481</td>
<td>Associate DH</td>
<td>Survey of graduating seniors in senior level courses</td>
</tr>
<tr>
<td></td>
<td>90% of former students will agree that the Nutrition curriculum provided technical knowledge that prepared them for professional programs, graduate study, or employment in food science related areas.</td>
<td>Administered by DH</td>
<td>Associate DH</td>
<td>Former student survey responses; Undergraduate assessment coordinator; % of favorable responses</td>
</tr>
<tr>
<td></td>
<td>90% of supervisors/employers will agree that former students have technical knowledge to excel in professional programs, graduate study and employment in food science and/or related areas.</td>
<td>Administered by DH</td>
<td>Associate DH</td>
<td>Supervisor/employer survey responses; Undergraduate assessment coordinator; % of favorable responses</td>
</tr>
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</table>

Goal #3: Measures: Rubric evaluation of identified assignments, graduating senior surveys, former student surveys, employer/supervisor surveys.
Program Goal

Goal #4 – Undergraduates will demonstrate critical thinking skills.

<table>
<thead>
<tr>
<th>Achievement Targets</th>
<th>Data Assessed</th>
<th>Assessment Method</th>
<th>Assessed by:</th>
<th>Action Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>80% of students will demonstrate critical thinking skills by scoring &gt;80% on</td>
<td>Proposed courses with assignments for assessment</td>
<td>Rubric evaluation of identified assignments</td>
<td>Course instructors</td>
<td>Obtain and evaluate data each semester course is taught</td>
</tr>
<tr>
<td>identified assignments.</td>
<td>NUTR 430</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>NUTR 481</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>90% of former students will agree that the Nutrition curriculum enhanced their</td>
<td>Former student survey responses</td>
<td>Survey 1-4 year out graduates</td>
<td>Former student surveys;</td>
<td>Compile data annually; determine % of favorable responses</td>
</tr>
<tr>
<td>critical thinking skills.</td>
<td></td>
<td></td>
<td>Undergraduate assessment</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>coordinator; % favorable responses</td>
<td></td>
</tr>
<tr>
<td>90% of supervisors/employers will agree that former students demonstrate critical</td>
<td>Supervisor/employer survey responses</td>
<td>Survey supervisors/employers of 1-4 year</td>
<td>Supervisor/employer surveys;</td>
<td>Compile data annually; determine % of favorable responses</td>
</tr>
<tr>
<td>thinking skills.</td>
<td></td>
<td>out graduates</td>
<td>Undergraduate assessment</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>coordinator; % favorable responses</td>
<td></td>
</tr>
</tbody>
</table>

Goal #4 Measures: Rubric evaluation of identified assignments, former student surveys, employer/supervisor surveys
Department of Nutrition and Food Science Senior Survey
Graduating Nutritional Science Senior Survey

Nutritional Sciences Major
___Dietetics (DPD) ___General Nutrition
___Molecular & Experimental ___Teacher Certification

Demographic Information
Gender: ___Female ___Male
Race/Ethnicity: ____American Indian or Alaska Native ____Asian ____Black or African American ____Hispanic ____Native Hawaiian or Other Pacific Islander ____White

Curriculum & Instruction
Based on your experiences in the Food Science Program, use the following scale to rate your level of preparation in the following areas:

| Knowledge & experiences that prepared me for employment in Nutrition or admission to a graduate or professional program | Excellent Foundation | Good Foundation | Satisfactory Foundation | Marginal Foundation | Inadequate Foundation | N/A |
| Written and oral communication skills | | | | | | |
| Ability to expand my knowledge because of activities completed inside and outside of class | | | | | | |
| Analyze & interpret scientific information | | | | | | |
| Team building skills that enhance working toward common group goals & outcomes | | | | | | |

One thing that would have enhanced my preparation for the future would have been:
_________________________________________________________________________________

Undergraduate Professional Activities and Experiences in Nutritional Science
Please check the following activities that you participated during your undergraduate career:
___Research experience (please briefly describe)____________________________________________________________
___Internship or study abroad experience (please specify location & date)____________________________________
___Leadership experience (please indicate positions held)
___Student member of the American Society of Nutrition (ASN)
___Student member of the Academy of Nutrition and Dietetics
___Student member of the Texas Academy of Nutrition and Dietetics
___Student member of the Mid-East Texas Academy of Nutrition and Dietetics
___Student member of the Texas Student Dietetic Association (TSDA)
___Member of the TAMU Nutrition Dietetic Association (NDA)
___Other professional organizations (please specify)
___Other campus organizations (please specify)
___Employment (please specify employer & location)

Post Graduate Plans
1. Do you have plans to apply to a dietetic internship (DI), graduate or professional program after graduation?  ___Yes ___No
2. Have you been accepted to a position in a DI, graduate or professional program or employment to begin after graduation?  ___Yes ___No
If you answered yes to #1 or #2, what position and where? ______________________________________________________

Ongoing Contact Information
The faculty in the Department of Nutrition and Food Science would like to maintain communication with you as you progress in your career. Please complete the following contact information that will allow us to keep in touch:
Name________________________________ Phone number ____________________________
Permanent mailing address________________________________________________________
Permanent email address __________________________________________________________
Assessment of Undergraduate Program: Food Science and Technology

Following a comprehensive curriculum review in 2011-2012 of the food science program, the faculty began to organize for better assessment of courses and course content. The major action plan of the 2012 assessment cycle was the development of standardized course-level assessment rubrics. These rubrics were implemented for the first time in spring 2013 for select food science courses over a 2 year period. The Assessment Committee was intentional to involve all faculty members in the assessment process to develop action plans to address unmet achievement targets. The program uses both direct and indirect assessment measures including current undergraduate student performance on assignments and exams and graduating senior, former student, and former student employers and supervisors survey responses. The NFSC faculty members developed and implemented an action plan to address critical thinking and technical knowledge, two deficient areas of the curriculum that included

- Appropriate usage of assignments in course instruction requiring applied knowledge and critical thinking skills
- Increased faculty discussion and sharing ideas on current strategies being used in the classroom
- Offering faculty training on the implementation of critical thinking assignments from the Center for Teaching Excellence (CTE)
- Offer faculty training on the implementation of critical thinking assignments
- Enhance faculty dialogues and interaction to promote critical thinking and technical knowledge strategies and help to more accurately identify our outside training requirements.

To help stream-line our aggressive assessment protocols, faculty also voted to reduce the number of goals that we collect data and focus on their achievement by setting targets to be that 80% of the students will score 80% or better on an identified goal. As a result of this discussion, we eliminated teamwork/collaboration and personal and social responsibility as program goals and rather focused on achieving goals for critical thinking, technical knowledge, communication skills and lifelong learning. We hope to work to accomplish this level of achievement and then revise these goals upward.
## Program Goal #1

Undergraduates will demonstrate effective written and oral communication skills. (Data Collected - 2015-2017; Reported – 2016-2017).

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<tr>
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<tr>
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<td>Proposed courses with assignments for assessment FSTC 401 FSTC 481</td>
<td>Rubric evaluation of identified assignments</td>
<td>Course instructors</td>
<td>Obtain data each semester course is taught</td>
</tr>
<tr>
<td>90% of graduating seniors will agree that the Food Science curriculum promoted effective written and oral communication skills.</td>
<td>Senior survey responses</td>
<td>Survey undergraduates in senior level courses</td>
<td>Administered by Associate DH</td>
<td>Administered in 481</td>
</tr>
<tr>
<td>90% of former students will agree that the Food Science curriculum enhanced their written and oral communication skills.</td>
<td>Former student survey responses</td>
<td>Survey 1-4 year out graduates</td>
<td>Former student surveys; Undergraduate assessment coordinator; % favorable responses</td>
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<td>Supervisor/employer surveys; Undergraduate assessment coordinator; % favorable responses</td>
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</tr>
</tbody>
</table>

**Program Goal #2.** Undergraduates will be prepared with skills to engage in lifelong learning through participation in faculty research activities, experiential learning opportunities and/or corporate internships to refine their career interests, learn essential research skills, and promote inquisitiveness and independent thought. (Data Collected - 2015-2017; Reported – 2016-2017)

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<td>Former student surveys; Undergraduate assessment coordinator; % favorable responses</td>
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<tr>
<td>90% of employers/supervisors agree that former students display inquisitiveness and independent thought</td>
<td>Supervisor/employer survey responses</td>
<td>Survey supervisors/employers of 1-4 year out graduates</td>
<td>Supervisor/employer surveys; Undergraduate assessment coordinator; % favorable responses</td>
<td>Compile data annually; determine % of favorable responses</td>
</tr>
</tbody>
</table>

Goal #2 Measures: Departmental Data, Graduating Senior Survey (TAMU), Former Student Surveys, Employer/Supervisor Surveys
**Program Goal #3.** Undergraduates will demonstrate technical knowledge required for a BS in Food Science. - (Data Collected – 2014-2016; Reported – 2015-2016).

<table>
<thead>
<tr>
<th>Achievement Targets</th>
<th>Data Assessed</th>
<th>Assessment Method</th>
<th>Assessed by:</th>
<th>Action Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>80% of students will display technical knowledge skills by scoring &gt;80% on identified assignments.</td>
<td>Proposed courses with assignments for assessment FSTC 201 FSTC 311 FSTC 315 FSTC 401</td>
<td>Course instructors</td>
<td>Obtain and evaluate data each semester</td>
<td></td>
</tr>
<tr>
<td>90% of graduating seniors will agree that the food science curriculum provided sound technical knowledge.</td>
<td>Senior survey responses</td>
<td>Survey undergraduates in senior level courses Administered by Associate DH</td>
<td>Administered in 481</td>
<td></td>
</tr>
<tr>
<td>90% of former students will agree that the curriculum provided technical knowledge that prepared them for professional programs, graduate study, or employment in food science related areas.</td>
<td>Former student survey responses</td>
<td>Survey 1-4 year out graduates Former student surveys; Undergraduate assessment coordinator; % favorable responses</td>
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<tr>
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<td>Supervisor/employer survey responses</td>
<td>Survey supervisors/employers of 1-4 year out graduates Supervisor/employer surveys; Undergraduate assessment coordinator; % favorable responses</td>
<td>Compile data annually; determine % of favorable responses</td>
<td></td>
</tr>
</tbody>
</table>

Goal #3 Measures: Rubric evaluation of identified assignments, graduating senior surveys, former student surveys, employer/supervisor surveys
**Program Goal #4.** – Undergraduates will demonstrate critical thinking skills. (Data Reported – 2015-2016)

<table>
<thead>
<tr>
<th>Achievement Targets</th>
<th>Data Assessed</th>
<th>Assessment Method</th>
<th>Assessed by:</th>
<th>Action Plan</th>
</tr>
</thead>
</table>
| 80% of students will demonstrate critical thinking skills by scoring >80% on identified assignments. | Proposed courses with assignments for assessment  
FSTC 314  
FSTC 315  
FSTC 401  
FSTC 481 | Rubric evaluation of identified assignments | Course instructors | Obtain and evaluate data each semester course is taught |
| 90% of former students will agree that the curriculum enhanced their critical thinking skills. | Former student survey  
Responses | Survey 1-4 year out graduates | Former student surveys;  
Undergraduate assessment coordinator;  
% favorable responses | Compile data annually; determine % of favorable responses |
| 90% of supervisors/employers will agree that former students demonstrate critical thinking skills. | Supervisor/employer survey responses | Survey supervisors/employers of 1-4 year out graduates | Supervisor/employer surveys;  
Undergraduate assessment coordinator;  
% favorable responses | Compile data annually; determine % of favorable responses |

Goal #4 Measures: Rubric evaluation of identified assignments, former student surveys, employer/supervisor surveys
Department of Nutrition and Food Science
Graduating Senior Survey

**Food Science Major**
___ Industry Option ___Science Option

**Demographic Information**
Gender: ___Female ___Male
Race/Ethnicity: ___American Indian or Alaska Native ___Asian ___Black or African American ___Hispanic ___Native Hawaiian or Other Pacific Islander ___White

**Curriculum & Instruction**
Based on your experiences in the Food Science Program, use the following scale to rate your level of preparation in the following areas:

<table>
<thead>
<tr>
<th>Area</th>
<th>Excellent Foundation</th>
<th>Good Foundation</th>
<th>Satisfactory Foundation</th>
<th>Marginal Foundation</th>
<th>Inadequate Foundation</th>
<th>N/A</th>
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<tbody>
<tr>
<td>Knowledge &amp; experiences that prepared me for employment in Food Science or admission to a graduate or professional program</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Written and oral communication skills</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ability to expand my knowledge because of activities completed inside and outside of class</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Analyze &amp; interpret scientific information</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Team building skills that enhance working toward common group goals &amp; outcomes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

One thing that would have enhanced my preparation for the future would have been:

__________________________________________________________________________________

**Undergraduate Professional Activities and Experiences in Food Science**
Please check the following activities that you participated during your undergraduate career:
___Research experience (please briefly describe)______________________________________
___Internship or study abroad experience (please specify location & date)______________
___Leadership experience (please indicate positions held)_____________________________
___Student member of the Institute of Food Technologists (IFT)_________________________
___Member of the TAMU Food Science Club______________________________________________
___TAMU College Bowl Team___________________________________________________________
___Competed as a member of the Product Development Team______________________________
___Other professional organizations (please specify)_______________________________________
___Other campus organizations (please specify)_________________________________________
___Employment (please specify employer & location)____________________________________

**Post Graduate Plans**
1. Do you have plans to apply to either graduate or professional school after graduation? ___Yes ___No
2. Have you been accepted to a position in either graduate or professional school or employment to begin after graduation? ___Yes ___No

If you answered yes to #1 or #2, what position and where? __________________________________________

**Ongoing Contact Information**
The faculty in the Department of Nutrition and Food Science would like to maintain communication with you as you progress in your career. Please complete the following contact information that will allow us to keep in touch:
Name_____________________________________ Phone number ____________________
Permanent mailing address____________________________________________________
Permanent email address______________________________________________________
Analysis of Assessment

**Nutrition:** A major shift towards solving a perceived need in the NUTR program was the approval of NUTR 289 - Current Perspectives in Nutrition, to be taught in conjunction with NUTR 203 – Scientific Principles of Human Nutrition in attempt to enhance written communication skills (as a writing intensive course) and critical thinking. The course learning objectives are: to foster curiosity and critical thinking about nutritional science, to explore how research contributes to our understanding of the role of nutrients in health and disease, to assess the quality of research, and to communicate interpretation of scientific research through short written assignments. As a result of faculty dialog and discussion, case studies were identified as a meaningful instruction tool through which strategic learning opportunities could be implemented in the classroom. Along with offering faculty training on the implementation of critical thinking assignments from Center for Teaching Excellence and Implementation of NUTR 289/204, we expect to initiate critical thinking for entry-level students and provide data that will be compared to graduating seniors in years to come.

**Food Science:** Following our comprehensive curriculum review, we are now in a better position to assess our student’s ability to critical think on subject-specific topics. We implemented a new course sequencing plan that gives students a stronger background in order to develop higher learning objectives and critical thinking skills from which to serve as a solid bases. Although critical thinking skills are generally considered to be independent of technical knowledge, it was concluded that many of the students did not have a solid basis from which to think critically from. Therefore, the implemented and approved changes to course sequencing should be a major factor in improving overall critical thinking. We anticipate it will take several years before these changes are fully realized in the program, which also allows the faculty time to develop and implement our assessment rubrics and to measure our improvements from the start (FSTC 201) to the end (FSTC 401) of our program. The food science faculty is proud that 1 in 4 of our students is participating in an experiential learning activity, and we hope to further increase these numbers in the future to enhance their critical thinking skills.
Faculty Profile

The “core” faculty includes those individuals with teaching or research or teaching/research responsibilities to the Nutrition or Food Science programs that are administratively located within the NFSC department.

<table>
<thead>
<tr>
<th>Title</th>
<th>Name</th>
<th>Home Dept</th>
<th>Faculty</th>
<th>Program</th>
<th>Ethnicity</th>
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</thead>
<tbody>
<tr>
<td>Assoc. Professor</td>
<td>Clinton Allred</td>
<td>NFSC</td>
<td>NUTR</td>
<td>Cancer biology</td>
<td>White, male</td>
</tr>
<tr>
<td>Lecturer</td>
<td>Karen Beathard</td>
<td>NFSC</td>
<td>NUTR</td>
<td>Didactic Program in Dietetics Director</td>
<td>White, female</td>
</tr>
<tr>
<td>Professor, DH</td>
<td>Boon Chew</td>
<td>NFSC</td>
<td>NUTR</td>
<td>Food bioactives</td>
<td>Asian, male</td>
</tr>
<tr>
<td>Distinguished</td>
<td>Robert S. Chapkin</td>
<td>NFSC</td>
<td>NUTR</td>
<td>Fat and fiber on the cellular signaling</td>
<td>White, male</td>
</tr>
<tr>
<td>Professor</td>
<td>Karen Geismar</td>
<td>NFSC</td>
<td>NUTR</td>
<td>Dietetic Internship Director</td>
<td>White, female</td>
</tr>
<tr>
<td>Assoc. Professor</td>
<td>Shaodong Guo</td>
<td>NFSC</td>
<td>NUTR</td>
<td>Diabetes and insulin resistance</td>
<td>Asian, male</td>
</tr>
<tr>
<td>Professor</td>
<td>Karen Kubena</td>
<td>NFSC</td>
<td>FSTC/NUTR</td>
<td>Nutrition and Disease</td>
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<tr>
<td>Lecturer</td>
<td>Saundra Lorenz</td>
<td>NFSC</td>
<td>NUTR</td>
<td>Diet and Health</td>
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<tr>
<td>Professor &amp; President Emerita</td>
<td>Elsa Murano</td>
<td>NFSC</td>
<td>FSTC</td>
<td>Food Microbiology, Safety &amp; Policy</td>
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<tr>
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<td>Peter Murano</td>
<td>NFSC</td>
<td>FSTC/NUTR</td>
<td>Nutrition Policy, Obesity</td>
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<tr>
<td>Assist. Professor</td>
<td>Yuxiang Sun</td>
<td>NFSC</td>
<td>NUTR</td>
<td>Obesity and diabetes</td>
<td>Asian, female</td>
</tr>
<tr>
<td>Professor, ADH</td>
<td>Steve Talcott</td>
<td>NFSC</td>
<td>FSTC</td>
<td>Food Chemistry &amp; Phytochemicals</td>
<td>White, male</td>
</tr>
<tr>
<td>Associate Professor</td>
<td>Susanne Talcott</td>
<td>NFSC</td>
<td>FSTC/NUTR</td>
<td>Pharmacokinetics &amp; Bioactives</td>
<td>White, female</td>
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<tr>
<td>Research Professor</td>
<td>Nancy Turner</td>
<td>NFSC</td>
<td>FSTC/NUTR</td>
<td>Fiber, Colon Cancer, Inflammation</td>
<td>White, female</td>
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<tr>
<td>Assoc. Professor</td>
<td>Chaodong Wu</td>
<td>NFSC</td>
<td>NUTR</td>
<td>Regulation of metabolism</td>
<td>Asian, male</td>
</tr>
<tr>
<td>Assist. Professor</td>
<td>Linglin Xie</td>
<td>NFSC</td>
<td>NUTR</td>
<td>Obesity and metabolism</td>
<td>Asian, female</td>
</tr>
<tr>
<td>Title</td>
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<tr>
<td>Professor</td>
<td>Gary Acuff</td>
<td>ANSC</td>
<td>FSTC</td>
<td>Food Micro. &amp; Safety</td>
<td>White, male</td>
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<tr>
<td>Associate Professor</td>
<td>Jenna D. Anding</td>
<td>NFSC</td>
<td>NUTR</td>
<td>Food insecurity and hunger.</td>
<td>White, female</td>
</tr>
<tr>
<td>Assoc. Professor</td>
<td>Christine Alvarado</td>
<td>POSC</td>
<td>FSTC/NUTR</td>
<td>Poultry Processing</td>
<td>White, female</td>
</tr>
<tr>
<td>Assoc. Professor</td>
<td>Joseph Awika</td>
<td>SCSC/NFSC</td>
<td>FSTC</td>
<td>Cereal Chemistry &amp; Carbohydrates</td>
<td>African, male</td>
</tr>
<tr>
<td>Professor</td>
<td>Williams S. Barnes</td>
<td>HLKN</td>
<td>NUTR</td>
<td>Exercise Physiology</td>
<td>White, male</td>
</tr>
<tr>
<td>Professor</td>
<td>John E. Bauer</td>
<td>VSCS</td>
<td>NUTR</td>
<td>Clinical Nutrition</td>
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</tr>
<tr>
<td>Professor</td>
<td>John B. Carey</td>
<td>POSC</td>
<td>FSTC</td>
<td>Poultry nutrition</td>
<td>White, male</td>
</tr>
<tr>
<td>Professor</td>
<td>Elena Castell-Perez</td>
<td>BAEN</td>
<td>FSTC</td>
<td>Food Eng. &amp; Rheology</td>
<td>Hispanic, female</td>
</tr>
<tr>
<td>Assoc. Professor</td>
<td>Alejandro Castillo</td>
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<td>FSTC</td>
<td>Food Micro., Fruits, Veg. &amp; Meat Prod.</td>
<td>Hispanic, male</td>
</tr>
<tr>
<td>Assoc. Professor</td>
<td>Luis Cisneros-Zevallos</td>
<td>HORT</td>
<td>FSTC</td>
<td>Phytochemistry, Post-Harvest</td>
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</tr>
<tr>
<td>Professor</td>
<td>Susan A. Bloomfield</td>
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<tr>
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<td>Raymond J. Carroll</td>
<td>STAT</td>
<td>NUTR</td>
<td>Bayesian Methods</td>
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<tr>
<td>Professor</td>
<td>Clarence R. Creger</td>
<td>POSC</td>
<td>NUTR</td>
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<tr>
<td>Assoc. Professor</td>
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<td>NUTR</td>
<td>Energy metabolism</td>
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<tr>
<td>Professor</td>
<td>Roderick Dashwood</td>
<td>IBT</td>
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<tr>
<td>Professor</td>
<td>Nicolaas Duetz</td>
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<tr>
<td>Assoc. Professor</td>
<td>Mariella Engelen</td>
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<td>NUTR</td>
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<tr>
<td>Professor</td>
<td>Delbert Gatlin</td>
<td>WFSC</td>
<td>NUTR</td>
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<td>Asst. Professor</td>
<td>Carmen Gomes</td>
<td>BAEN</td>
<td>FSTC</td>
<td>Engineering and encapsulation</td>
<td>Hispanic, female</td>
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<td>NUTR</td>
<td>Clinical research</td>
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<tr>
<td>Professor</td>
<td>Richard Kreider</td>
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<td>NUTR</td>
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<tr>
<td>Regents Professor</td>
<td>David N. McMurray</td>
<td>MMP</td>
<td>NUTR</td>
<td>Pathogenesis in tuberculosis</td>
<td>White, male</td>
</tr>
<tr>
<td>Professor</td>
<td>W. Alex McIntosh</td>
<td>SOCI</td>
<td>NUTR</td>
<td>Sociology of Food &amp; Nutrition</td>
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</tr>
<tr>
<td>Professor / Title</td>
<td>Name</td>
<td>Department</td>
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<tr>
<td>Professor</td>
<td>Wallace McKeegan</td>
<td>BIO/BIO</td>
<td>NUTR</td>
<td></td>
<td>Prostate and liver biology</td>
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<tr>
<td>Professor</td>
<td>Rhonda Miller</td>
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<td>FSTC/NUTR</td>
<td></td>
<td>Meat Technology &amp; Sensory</td>
</tr>
<tr>
<td>Professor</td>
<td>Ranjita Misra</td>
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<td>NUTR</td>
<td></td>
<td>Health Education</td>
</tr>
<tr>
<td>Professor</td>
<td>Rosana Moreira</td>
<td>BAEN</td>
<td>NUTC</td>
<td></td>
<td>E-Beam Appl. &amp; modeling</td>
</tr>
<tr>
<td>Assoc. Professor</td>
<td>Wesley Osburn</td>
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<td></td>
<td>Meat Technology &amp; Processing</td>
</tr>
<tr>
<td>Professor</td>
<td>Bhimanagouda S. Patil</td>
<td>HORT</td>
<td>NUTR</td>
<td></td>
<td>Plant breeding</td>
</tr>
<tr>
<td>Professor</td>
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<td>VAPH</td>
<td>FSTC</td>
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<tr>
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<td>Suresh Pillai</td>
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<td>Exercise Physiology</td>
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<td>Research Scientist</td>
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<td>FSTC</td>
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<td>Food Processing &amp; Extrusion</td>
</tr>
<tr>
<td>Associate Professor</td>
<td>Sharon Robinson</td>
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<td>NUTR</td>
<td></td>
<td>Nutrition Essentials for Extension</td>
</tr>
<tr>
<td>Professor</td>
<td>Lloyd Rooney</td>
<td>SCSC</td>
<td>FSTC</td>
<td></td>
<td>Cereal Quality &amp; Carbohydrates</td>
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<tr>
<td>Professor</td>
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<td>FSTC</td>
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<tr>
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<tr>
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<td>VTPP</td>
<td>NUTR</td>
<td></td>
<td>Intracellular lipid transfer proteins</td>
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<tr>
<td>Assoc. Professor</td>
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<td>NUTR</td>
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<td>Behavior and Health</td>
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<tr>
<td>Professor</td>
<td>Stephen Smith</td>
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<td>FSTC</td>
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<td>Meat Biochemistry &amp; Cell Physiology</td>
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<tr>
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<td>Assoc. Professor</td>
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<td>NUTR</td>
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<tr>
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<td>Debra Zoran</td>
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<td>NUTR</td>
<td></td>
<td>Gastroenterology, small animal</td>
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</tbody>
</table>
Number

The NFSC department has a combination of lecturers (3) and teaching/research faculty (12) who cover a significant portion of the academic programs in Nutrition but only a small portion of the courses in Food Science. There have been from 34-39 graduate members of the Nutrition faculty and 31-32 members of the graduate Food Science Faculty in the past 5 years, counting faculty membership at all ranks and classifications of our graduate program.

Faculty/Student Ratio

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<th>Year</th>
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<th>M.S./Ph.D.</th>
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<td>2010</td>
<td>39</td>
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<td>2013</td>
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<tr>
<td>2014</td>
<td>59</td>
<td>6.3</td>
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Publications (5 years)

From a total of 39 associated with the faculty of Nutrition and 32 faculty associated with the graduate faculty of Food Science.

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<th>Year</th>
<th>Publications-NUTR</th>
<th>Publications-FSTC</th>
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<tr>
<td>2013</td>
<td>5.40</td>
<td>3.26</td>
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<td>2014</td>
<td>4.73</td>
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<td>2015</td>
<td>3.15</td>
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External Grants (5 years)

From a total of 39 associated graduate faculty of Nutrition and 32 associated graduate faculty of Food Science.

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<th>Grants-FSTC</th>
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<td>2013</td>
<td>$222,962</td>
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<tr>
<td>2014</td>
<td>$179,026</td>
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<td>2015</td>
<td>$258,579</td>
<td>$111,878</td>
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</table>
Teaching Load

Student Credit Hours per Full-Time Faculty Equivalent

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<tr>
<th>Year</th>
<th>B.S.</th>
<th>M.S.</th>
<th>Ph.D.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>587</td>
<td>66</td>
<td>45</td>
</tr>
<tr>
<td>2011</td>
<td>589</td>
<td>48</td>
<td>45</td>
</tr>
<tr>
<td>2012</td>
<td>588</td>
<td>not reported</td>
<td>66</td>
</tr>
<tr>
<td>2013</td>
<td>686</td>
<td>not reported</td>
<td>62</td>
</tr>
<tr>
<td>2014</td>
<td>885</td>
<td>not reported</td>
<td>57</td>
</tr>
</tbody>
</table>

Faculty Qualifications

Faculty qualifications vary among lecturers, extension faculty, non-tenure track research professors, and tenure-track professors depending on the position need and qualifications for the position. However, the individual faculty member is expected to teach or conduct scholarly activity in human nutrition or the food sciences to advance essential knowledge within the discipline, effectively teach courses in nutritional science or food science or closely related area, to develop and execute programs that serve the needs of clientele within Texas, and actively participate in professional activities that promotes professional growth and development, and serve in a capacity that benefits the citizens of Texas. Our research faculty positions require an earned Ph.D. in Nutritional Science or Food Science, or a related area with the potential for or a record of distinction in teaching, research and/or extension. Post-doctoral experience is preferred. The positions also requires demonstrated competency in Nutrition or Food Science, sound management of programs and resources, an understanding of the teaching, research, extension and service mission of the department, college and university, and a strong commitment to carry out this important mission. The faculty must possess effective communication and interpersonal skills and exhibit those qualities that would bring integrity to the individual and institution, and contribute to the Department’s goal of achieving and maintaining national and international prominence.

Research faculty are expected to development a nationally recognized research program that addresses high priority nutritional or food science needs in a specific area of expertise that leads to expansion of critical knowledge, scholarly achievement, excellence in research, discovery of new and innovative technologies, an enhanced understanding of biological mechanisms or systems and/or creation of intellectual property; other duties include securing extramural funds to support ongoing research activities and effectively communicating the significance or impact of the research performed. Faculty are expected to supervise and train undergraduate students, M.S. and Ph.D. degree candidates and/or post-doctoral appointees in the disciplines.

Teaching faculty are expected to teach undergraduate and graduate courses in nutrition or food science in their respective areas of expertise and others as assigned; other responsibilities include mentoring of students and providing academic guidance to enable success within the discipline.

Extension faculty are to plan, develop, and implement Extension Programs in assigned program areas that meet or exceed Agency objectives; effectively conduct Extension education programs designed for Extension Agents, key clientele, volunteer leaders and adult/youth to address relevant issues.

Service to the department, college, university and the general public as part of the ongoing mission of a Land Grant Institution; service in professional organizations, various department, college or university committees, special assignments, government service, special commissions or appointments, and public service external to the University as deemed beneficial to the public good are also included.
Faculty Analysis: Using the Department’s Standards

The NFSC faculty has performed well over the past year, especially in comparison to national averages for faculty productivity, granting success, and impact of our work. Data indicate that our tenure and tenure-track faculty are highly productive in their academic pursuits, which has carried over into our academic programs. The NFSC faculty has trained a diverse student body with over 6% African-American, 25% Latino/a, and over 50% women. Our students are over 25% first-generation students and over 30% are supported on federal Pell Grants. Of these, 85% are placed in jobs, assignments, or competitive programs within 6 months of graduation. All of our faculty are engaged as peer reviewers for grants and journals, and 80% hold an elected office in a national or professional society. Our faculty members average over $220,000 in grants annually and are cited over 30 times per year per faculty member in their professional work. About 25% have patents, copyrights, procedures, or textbooks adopted or used prominently by the scientific community.
Student Profile

Undergraduate Students

The undergraduate student population has largely experienced a steady growth in numbers over the past 5 years, but has nearly doubled from student numbers when the department was first formed in 2005. Our majors are very popular and we must continuously be cautious about over-populating our courses so that students can matriculate in a timely manner. We have inherent limitations with classroom sizes, number of sections to teach per year, and laboratory accommodations in relation to the number of faculty teaching undergraduate courses.

Doctoral Students

The graduate student population has also increased over the past 5 years with a stronger departmental and institutional emphasis placed on recruiting top doctoral students. Incentives to train doctoral students are obvious to many researchers, and our College now requires teaching assistants be doctoral students/candidates and requires special permission for non-doctoral students. Our PhD student numbers are at 35 students but these numbers will grow considerably in 2016 with new faculty hires and success in grants, fellowships, and diversity fellowships awarded to our top recruits.
Student Diversity /Demographics

During the fall 2015, 38 PhD students were enrolled in the Department of Nutrition and Food Science that included 3 PhD students who graduated in December 2015, and 6 PhD students who are projected to graduate in the spring or summer of 2017. The demographic composition of the department is diverse in terms of national origin with 63% of the PhD students international including students from Belgium, Brazil, China, Colombia, Ecuador, Ethiopia, Ghana, India, Iraq, Jordan, Korea, Malaysia, Mexico, Saudi Arabia, and Taiwan. Most of our PhD students (76%) are female and 13% are U.S. citizens from ethnic and racial minority groups.

<table>
<thead>
<tr>
<th>Citizenship, Ethnicity, and Race of NFSC Doctoral Students Fall 2015</th>
<th>Nutrition</th>
<th>Food Science</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>Foreign Nationals holding temporary visas, regardless of race or ethnicity</td>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>Hispanic/Latino ethnicity (one or more races)</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>One race, American Indian/Alaska Native</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Once race, Asian</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>One race, Black/African American</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>One race, Native Hawaiian/Other Pacific Islander</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>One race, White</td>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>More than one race (Not Hispanic/Latino)</td>
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<td>0</td>
</tr>
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<td>Ethnicity/race unknown or not stated</td>
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<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>4</td>
<td>16</td>
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</tbody>
</table>
Graduation Retention and Graduation Rate

Doctoral Student Retention and Graduation Rates

<table>
<thead>
<tr>
<th>Year</th>
<th>Major</th>
<th>Initial Cohort</th>
<th>1-Yr Retained</th>
<th>2-Yr Retained</th>
<th>4-Yr Retained</th>
<th>4-Yr Graduated</th>
<th>5-Yr Retained</th>
<th>5-Yr Graduated</th>
<th>6-Yr Retained</th>
<th>6-Yr Graduated</th>
<th>7-Yr Retained</th>
<th>7-Yr Graduated</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>FSTC</td>
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<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>2007</td>
<td>NUTR</td>
<td>3</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>66</td>
<td>33</td>
<td>33</td>
<td>66</td>
<td>100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2008</td>
<td>FSTC</td>
<td>1</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2008</td>
<td>NUTR</td>
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<td>100</td>
<td>100</td>
<td>50</td>
<td>50</td>
<td>50</td>
<td>50</td>
<td>50</td>
<td>100</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>2009</td>
<td>FSTC</td>
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<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>2009</td>
<td>NUTR</td>
<td>8</td>
<td>75</td>
<td>75</td>
<td>25</td>
<td>25</td>
<td>25</td>
<td>12</td>
<td>25</td>
<td>12</td>
<td>25</td>
<td></td>
</tr>
<tr>
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<td>FSTC</td>
<td>4</td>
<td>100</td>
<td>50</td>
<td></td>
<td>50</td>
<td></td>
<td>50</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2010</td>
<td>NUTR</td>
<td>3</td>
<td>66</td>
<td></td>
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<td></td>
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<td></td>
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<td>NUTR</td>
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<td>80</td>
<td>30</td>
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<td></td>
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<td></td>
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</tr>
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<td>2012</td>
<td>FSTC</td>
<td>4</td>
<td>100</td>
<td>75</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2012</td>
<td>NUTR</td>
<td>4</td>
<td>75</td>
<td>75</td>
<td>50</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2013</td>
<td>FSTC</td>
<td>4</td>
<td>100</td>
<td>75</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2013</td>
<td>NUTR</td>
<td>5</td>
<td>60</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2014</td>
<td>FSTC</td>
<td>4</td>
<td>75</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2014</td>
<td>NUTR</td>
<td>3</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Institutional Financial Support Provided

Graduate students in the Department of Nutrition and Food Science are funded from a variety of sources including faculty grants, college fellowships, and graduate assistantships. The department does not currently have the resources to provide all students with departmental support. However, we will utilize our funds for teaching assistants to fund a “2 + 1” program that offers faculty 2 years of support for a PhD level teaching assistant (4 semesters teaching) in return for 1 full year and 2 summers of support from a faculty. This funding model deviates from the past when students were funded for single semesters, with no long term program commitment. Opportunities for funding depend on a student’s degree status, year in the program, and faculty affiliation.

Recruitment Fellowships

Texas A&M Graduate Diversity Fellowship (Office of Graduate Studies)

These are three-year fellowships to recruit top incoming students who contribute to the diversity of the student body. The award includes an $18,000 stipend per year for three years, $9,000 per year for tuition and fees, and a departmental assistantship (an additional $9,100 stipend/year) for three years. Students who receive this award
are required to work as teaching or research assistants each year. Only U.S. citizens and permanent residents are eligible for this award. All incoming PhD students who meet this eligibility requirement AND who will contribute to the overall diversity of the university may be considered for this award. The department submits nominations for eligible students to the Office of Graduate Studies.

**College of Agriculture and Life Sciences Excellence Fellowship**

This is a one year fellowship with the goal to recruit and matriculate top quality MS and PhD graduate students, especially students that add diversity to the graduate program. The Excellence fellowship is a one-half departmental base assistantship. The department supplies a 1/2-time effort assistantship written at half the departmental base assistantship rate, with a minimum of $7,600 per year. Preference is given to PhD students or Master of Science (thesis option) students who have declared a career objective to pursue a PhD.

**College of Agriculture and Life Sciences Merit Fellowship**

This is a one year fellowship that aims to recruit and matriculate top quality PhD graduate students; Master of Science (thesis option) students who have declared a clear career objective to pursue aPh.D; and especially students with the potential to make unique contributions to our graduate program. The fellowship is at the departmental base rate +20% for one year plus approximately $10,500 to cover the cost of tuition, fees, and the graduate student health plan. The department must agree to supply assistantship funding in future years at the departmental rate and develop a mentoring plan. Only U.S. citizens and permanent residents are eligible for this award.

**TAMUS LSAMP Bridge to the Doctorate**

This is a 2 year fellowship open to U.S. citizens or permanent residents who are underrepresented minorities. Students must plan to pursue a PhD in a STEM field and received their previous degree from an LSAMP institution. The fellowship includes an annual stipend of $30,000 and an allotment of $9000 distributed in the fall and spring semesters for educational expenses, such as tuition, fees, health insurance, and research supplies. No departmental matching funding is required for subsequent years, but additional funding is common.

**Graduate Assistantships**

The department offers students both graduate teaching and research assistantships. The average monthly stipend for MS students is $1,250 and the monthly stipend for PhD students is $1,350. PhD students with assistantships typically receive tuition assistance from the college in addition to the monthly stipend. Travel awards are also available to graduate students ($500/yr) for presenting at conferences.

**NFSC PhD Student Average Institutional Support**

<table>
<thead>
<tr>
<th></th>
<th>Nutrition PhD</th>
<th>Food Science PhD</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>$17,550</td>
<td>$17,550</td>
</tr>
<tr>
<td>2014</td>
<td>$14,292</td>
<td>$8,619</td>
</tr>
<tr>
<td>2013</td>
<td>$16,600</td>
<td>$16,600</td>
</tr>
<tr>
<td>2012</td>
<td>$12,300</td>
<td>$12,300</td>
</tr>
<tr>
<td>2011</td>
<td>$12,318</td>
<td>No data</td>
</tr>
<tr>
<td>2010</td>
<td>$12,407</td>
<td>No data</td>
</tr>
</tbody>
</table>
Percentage of full time students with institutional financial support

<table>
<thead>
<tr>
<th>Year</th>
<th>% Nutrition PhD</th>
<th>% Food Science PhD</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>83</td>
<td>64</td>
</tr>
<tr>
<td>2014</td>
<td>92</td>
<td>69</td>
</tr>
<tr>
<td>2013</td>
<td>69</td>
<td>50</td>
</tr>
<tr>
<td>2012</td>
<td>81</td>
<td>81</td>
</tr>
<tr>
<td>2011</td>
<td>82</td>
<td>No data</td>
</tr>
<tr>
<td>2010</td>
<td>91</td>
<td>No data</td>
</tr>
</tbody>
</table>

Student Publications/Presentations

PhD Student Publications/Presentations for the 2014/2015 Academic Year

<table>
<thead>
<tr>
<th>Program</th>
<th>Presentations</th>
<th>Average/Student</th>
<th>Papers Published</th>
<th>Papers/Student</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nutrition</td>
<td>28</td>
<td>2.15</td>
<td>9</td>
<td>0.69</td>
</tr>
<tr>
<td>Food Science</td>
<td>20</td>
<td>1.53</td>
<td>5</td>
<td>0.38</td>
</tr>
</tbody>
</table>

PhD student number of publications, presentations, and book chapters per year per student

<table>
<thead>
<tr>
<th>Year</th>
<th>Nutrition</th>
<th>Food Science</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>1.33</td>
<td>0.82</td>
</tr>
<tr>
<td>2013</td>
<td>5.0</td>
<td>5.0</td>
</tr>
<tr>
<td>2012</td>
<td>5.0</td>
<td>7.5</td>
</tr>
<tr>
<td>2011</td>
<td>5.1</td>
<td>No data</td>
</tr>
</tbody>
</table>

Employment Profile

During the last 5 years our PhD students have accepted postdoctoral positions at several institutions including Baylor, Institute Curie, Texas A&M, UC Davis, and the University of New Mexico. Students have also accepted faculty positions at Cornell, Zamorano University (Honduras), Federal University of Vicoso (M.G. Brazil), and the University of Maryland. Businesses that have hired our PhD students include Allied Blending and Ingredients, Frito Lay, Kellogg’s, Skretting, among others.

Placement of PhD students 2011-2015

<table>
<thead>
<tr>
<th>Field</th>
<th>Nutrition</th>
<th>Food Science</th>
</tr>
</thead>
<tbody>
<tr>
<td>Academia/Research</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Private Industry</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Postdoc</td>
<td>7</td>
<td>1</td>
</tr>
<tr>
<td>Healthcare/Dietetics</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>No info</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>
All Other Students (Master of Science in NUTR or FSTC)

Student diversity / demographics

<table>
<thead>
<tr>
<th>Citizenship, Ethnicity, and Race of NFSC Masters Students Fall 2015</th>
<th>Nutrition</th>
<th>Food Science</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>Foreign Nationals holding temporary visas, regardless of race or ethnicity</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Hispanic/Latino ethnicity (one or more races)</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>One race, American Indian/Alaska Native</td>
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</tr>
<tr>
<td>One race, Asian</td>
<td>0</td>
<td>1</td>
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<tr>
<td>One race, Black/African American</td>
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<tr>
<td>One race, Native Hawaiian/Other Pacific Islander</td>
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<tr>
<td>One race, White</td>
<td>0</td>
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</tr>
<tr>
<td>More than one race (Not Hispanic/Latino)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Ethnicity/race unknown or not stated</td>
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<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>0</td>
<td>8</td>
</tr>
</tbody>
</table>

Graduate Placement /Employment

Placement of MS students 2011-2015

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<thead>
<tr>
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<th>Nutrition</th>
<th>Food Science</th>
</tr>
</thead>
<tbody>
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<td>Research</td>
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<td>Education</td>
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<tr>
<td>Government</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Healthcare/Dietetics</td>
<td>11</td>
<td>2</td>
</tr>
<tr>
<td>PhD Program</td>
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<td>No info</td>
<td>6</td>
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</tbody>
</table>
Student Publications /Presentations /Awards

MS Student Publications/Presentations for the 2014/2015 Academic Year

<table>
<thead>
<tr>
<th>Program</th>
<th>Presentations</th>
<th>Average/Student</th>
<th>Papers Published</th>
<th>Papers/Student</th>
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</thead>
<tbody>
<tr>
<td>Nutrition</td>
<td>3</td>
<td>0.33</td>
<td>5</td>
<td>0.5</td>
</tr>
<tr>
<td>Food Science</td>
<td>13</td>
<td>0.92</td>
<td>6</td>
<td>0.42</td>
</tr>
</tbody>
</table>

Student professional development

Professional development is available to graduate students through Texas A&M’s Center for Teaching Excellence (CTE) and the Office of Graduate and Professional Studies. CTE offers several programs including the Academy for Future Faculty, Teaching Assistant Institute, STEM Teaching Professional Development Course, Graduate Teaching Consultant Program, TA Mentor Training, and Individual Consulting. The Office of Graduate and Professional Studies (OGAPS) strives to promote and expand opportunities for graduate students to engage in professional development activities that will prepare them for their future careers- whether in academia, industry, government, non-profit organizations or elsewhere. These activities help graduate students develop professional skills to complement the discipline specific knowledge gained in their degree program. OGAPS has identified four key skill areas for graduate student professional development to guide programming and resources. OGAPS works in collaboration with other non-academic offices on campus to deliver coordinated professional development programs that provide high-impact learning experiences specific to the graduate experience and promote commitment to learning for a lifetime in our graduate and professional students.

Center for Teaching Excellence (CTE)

Academy for Future Faculty (AFF)

The Academy for Future Faculty (AFF) (formerly Graduate Teaching Academy) is a CIRTL@TAMU program. The Center for the Integration of Research, Teaching, and Learning (CIRTL) is an NSF Center for Learning and Teaching in higher education. The CIRTL mission is to enhance excellence in undergraduate education through the development of a national faculty committed to implementing and advancing effective teaching practices for diverse learners as part of successful and varied professional careers. As a CIRTL@TAMU program, AFF provides professional development for graduate students and post-docs in preparation for a career in higher education. AFF offers a two-semester program anchored by faculty mentorship and featuring weekly seminars and workshops. AFF events are free and open to everyone in the Texas A&M University academic community. Participants may choose to attend a few events or enough to complete requirements for the Academy for Future Faculty Fellow certificate. New fellows are recognized at our annual banquet in April.

These benefits include:

- Opportunity to learn from a diverse pool of professors known for excellence in teaching.
- Mentorship in the area of teaching in higher education environments
- Exploration of career paths.
- Developments of teaching portfolio materials for use in academic job searches.
- Opportunity to earn a certificate of completion with designation as a AFF Fellow
- Advanced professional development opportunities for AFF Fellows, including: opportunity to earn the Senior Fellow Certificate, leadership opportunities, research projects, and participate in forums or learning communities on college teaching
Teaching Assistant Institute (TAI)

The university-mandated TA Training Program supports new TAs in their assignments as lecturers, lab instructors, recitation leaders, and course graders for their departments. This one day training program provides new TAs the opportunity to clarify, question, apply, and organize knowledge comprising foundational principles in teaching and learning.

STEM Teaching Professional Development Course

Doctoral level students who desire a career in academia can benefit greatly from training and experiences in teaching. The STEM Professional Development in Teaching course enables selected PhD students to learn how to teach and includes the opportunity to design and implement a course module with a faculty mentor. The course is facilitated by teaching and learning consultants from the Center for Teaching Excellence (CTE). The course is open to all PhD students.

Graduate Teaching Consultant (GTC) Program

The Graduate Teaching Consultant Program supports the professional development in teaching of graduate students, and includes opportunities that support enhanced teaching experience, as outlined in the Model of Graduate Student Professional Development in Teaching. GTCs are graduate students exhibiting pedagogical skills and knowledge within their disciplines. GTCs, under the supervision of the Center for Teaching Excellence (CTE), serve as instructional coaches and peer mentors to TAs across campus. GTCs are available to conduct classroom observations upon request.

TA Mentor Training

TA Mentor Training assists experienced TAs in the development of skills, attitudes, and techniques needed to effectively mentor new TAs during the university-mandated TA Training Program. TA Mentors serve as facilitators for a variety of small group breakout sessions at TA Training and are instrumental to the professional development of new TAs in teaching. TA Mentor Training also supports mentors in the continual development of their own classroom teaching practice.

Individual Consulting

CTE offers one-on-one consulting with all graduate students and postdoctoral researchers on teaching related topics such as instructional methodology, syllabus design, effective feedback, and assessment. In addition, graduate students serving as Teaching Assistants (TAs) can schedule an observation of their classroom teaching and receive written feedback for their records. Graduate students and postdoctoral researchers can meet with a CTE consultant to discuss and/or review their teaching philosophy statement.

Office of Graduate and Professional Studies (OGAPS)

G.R.A.D. Aggies

G.R.A.D. Aggies is a compilation of professional development opportunities including workshops, seminars, training events and online resources. G.R.A.D. Aggies aims to help students engage in activities and resources to better prepare them for professional life after graduate school. G.R.A.D. Aggies is a collaborative effort of several non-academic offices at the university.
Professional Development (PD) Portal

The PD Portal is a tool connecting students with professional development activities and resources at the department, college, or university level. Students can use the Professional Development Portal to search for opportunities by professional development skill area, college or academic unit, target audience or any combination of the three.

3 Minute Thesis Competition

Three Minute Thesis (3MT®) is a research communication competition developed by The University of Queensland (UQ). Graduate students have three minutes to present a compelling oration on their thesis and its significance. The winner of the Texas A&M 3 Minute Thesis Competition will advance to represent the University at the Regional Competition at the Conference of Southern Graduate Schools.

Versatile PhD Career Tool

Designed to help graduate students identify, prepare for, and excel in non-academic careers, Versatile PhD provides original, first-person content from real-life Ph.D.’s and ABD’s succeeding outside of the academy. Students learn how they became employed in fields as wide-ranging as Business, Policy, Biotechnology, and Intellectual Property by reading their “Hiring Success Stories”.

Center for the Integration of Research, Teaching, and Learning (CIRTL)

The Center for the Integration of Research, Teaching, and Learning (CIRTL) is a National Science Foundation (NSF) funded network of research universities committed to preparing outstanding future faculty in STEM disciplines, with the ultimate goal of improving undergraduate STEM education in the U.S. CIRTL offers several local programs at Texas A&M University centered on preparing future faculty and college teaching. They also offer online resources and programs from the CIRTL Central Network for students to utilize if unable to participate in the local face-to-face programs.

Concluding Observations

The NFSC department hosts vibrant and robust academic programs that produce leaders in the fields of nutrition, dietetics, and food science. However, we aim for continued growth of our programs in both number and quality and offer ever-expanding opportunities for our current and future students. Our academic committees have long-term goals for program enhancement that will help train well-prepared students for a changing future. We are working to implement more High-Impact Learning opportunities for students such as Study Abroad, internships, and hands-on or practical learning modules for our students. Additionally, as we implement the NUTR 204 course (with the possibility of a FSTC 204 course as well) to meet the technical writing and critical thinking needs of our students, we preemptively filling a recognized gap in the future needs of our students. Likewise as we move towards ACEND’s future requirements of a graduate degree to sit for an RD exam, we are preemptively creating a non-thesis NUTR degree in clinical nutrition that would not only make our program a combined DPD program but will allow Texas A&M NFSC to be a go-to place for dietetic internships in Texas, especially for institutions without a graduate program. Additionally, the graduate faculty is working to create a core curriculum for NUTR that will provide our graduates will have sufficient classroom and hands-on laboratory skills to meet the challenges of nutrition research into the foreseeable future. Our food science group is working to develop our Food Diversity program and possibly future programs in food entrepreneurship, food business startups, and commercial food product development. However, we are limited by core faculty numbers and the physical infrastructure to realize many of our programmatic goals. The inter-disciplinary nature of our graduate programs is great for research collaborations, but is not always advantageous for our academic programs. Still, the future is bright for the NFSC department. Having moved into a newly renovated building in 2014 and hiring 4 new NUTR core faculty members in 2015, we are a department on the rise. Our academic programs are among the largest in our college and our field of food and nutrition serves as the nexus among our peers in other agricultural disciplines.