COLLEGE OF NATURAL AND APPLIED SCIENCES
AGRICULTURE AND LIFE SCIENCES PROGRAM

OVERVIEW

OBJECTIVES

Agriculture and Life Sciences Division within the College of Natural Applied Sciences will offer the Master of Science in Sustainable Agriculture, Food, and Natural Resources (SAFNR) Program with two tracks to create leaders and professionals for the next generation needed to address challenges which are closely tied to the global food systems, nutrition and human health, energy security, climate change, as well as agricultural enterprises, using sustainable approaches. The goal of the program therefore, will include educating students and developing and disseminating science-based information to promote sustainable agricultural production, healthy living, and natural resource management that is appropriate for the Western Pacific Region. Courses are offered by faculty from the College of Natural and Applied Sciences, School of Nursing and Health sciences, College of Liberal Arts, and the sponsored programs. Specific objectives of the program include seeking answers to agricultural and natural resources as well as food, nutritional and health related questions, especially those arising in the developing island nations of the Pacific; promoting needed educational and service projects in Western Pacific island communities; and equipping graduates with the knowledge and skills needed for sound scientific inquiry and professional practice, and a solid understanding and commitment to professional ethics in the pacific regions.

PROGRAM LEARNING OUTCOMES

Upon successful completion of the Program:

1. The students will demonstrate the ability to apply, analyze, synthesize and evaluate issues in the areas of sustainable agriculture, food, nutrition and natural resources.
2. The students will demonstrate mastery in quantitative and/or qualitative data collection and analysis in agricultural science, food and nutrition science, as well as the natural resources.
3. They will demonstrate ability to write technical scientific reports and articles.
4. The students will demonstrate knowledge of current topics and research activities related to sustainable agriculture, food and natural resource sciences in the literature as well as in the island communities.
5. Students will demonstrate the ability to conceive, conduct and report original research results.
6. Students will apply knowledge and technical skills in order to solve discipline related challenges in tropical systems.

ADMISSION

GENERAL ADMISSION REQUIREMENTS

Applicants must first meet all University requirements stated under "Academic Requirements, Section B. Admission Requirements for Graduate Status." Once admitted by the University’s Graduate Admissions Office, students may apply for admission to the ‘Master of Science in Sustainable Agriculture, Food and Natural Resources’ (SAFNR) Program.

For Pre-candidate status, students must submit the following to the SAFNR Admissions and Recruitment Committee:

1. A written, personal statement in English of up to 1000 words that addresses:
   a. A discussion of why the student is applying specifically to SAFNR, highlighting aspects of the program that most attracts him/her.
   b. A description of the research interest that the student would like to explore and the academic and/or professional experiences that have most prepared him/her to study that topic.
2. A resume or curriculum vitae (CV) that outlines personal, professional, and academic experiences that have prepared the student to pursue training in the SAFNR program,

3. A copy of all undergraduate transcripts,

4. Three (3) letters of recommendation submitted from individuals familiar with the student’s academic or professional performance.

5. Pre-candidates MUST apply for Candidate status prior to completing 12 credit hours towards the SAFNR degree.

For Candidate status:

1. The student must maintain at least a 3.0 GPA for all graduate courses,

2. The student will form a Thesis Committee composed of the thesis advisor (chairperson) and at least two additional members, one of whom must be from outside the specialty area of the thesis project,

3. The student will present to the UOG community an oral proposal for a thesis project.

Application packages are first evaluated by the Admissions and Recruitment Committee who then present their recommendation to the Program Chair. Upon approval by the Program Chair, the applicant is admitted to the program as Pre-candidate or Candidate.

BACKGROUND AND PERFORMANCE GUIDELINES

The SAFNR is built around two component disciplines (Tracks): Sustainable Agriculture and Natural Resources, and of Food and Nutrition. Applicants are expected to have backgrounds related to at least one of these disciplines. Related backgrounds are broadly defined. Students who do not possess these background courses will be advised to take key undergraduate courses as part of their program. For example, for Sustainable Agriculture, related disciplines include all the sub-disciplines of biology and other life sciences, such as biochemistry, or genetics; the health sciences; and agricultural, animal, and plant sciences. Disciplines related to Natural Resources include the natural sciences, particularly the earth sciences, tropical ecosystem, and atmospheric sciences. Relevant disciplines also include; applied mathematics, statistics, and computer science. Applicants with other backgrounds, especially with interdisciplinary training or experience, who have completed the prerequisites listed below or can provide other evidence of their ability to successfully complete the core course requirement will be considered as well.

TRACKS

The two tracks of the program will cover the following topics:

SUSTAINABLE AGRICULTURE AND NATURAL RESOURCES

The following topics will be covered in the Track of Sustainable Agriculture and Natural Resources:

- Evaluation methods of plant, soil and natural resources interaction
- Technologies in sustainable agriculture and agro-ecosystem
- Method of selection of plants adapted to environments
- Plant materials in tropical urban landscape and farms
- Evolving methods of engineering technologies in tropical sustainable agriculture
- Effects of soil fertility on plant nutrition and metabolism
- Experimental designs in agricultural field and laboratory
- Sustainable animal production systems
- Agricultural biotechnology
- Tropical aquaculture

FOOD AND NUTRITION

The following topics will be covered in the Track of Food and Nutrition:

- Applications and issues related to nutrition research
- Dietary assessment methods; nutrition monitoring and surveillance
- Evolving methods of assessing health status
- Assessment and treatment of nutritional health risks
- Health promotion and disease prevention theories and guidelines
- Influence of socioeconomic, cultural and psychological factors on food and nutrition behaviour
• Food safety issues, solutions, and regulations
• Food security and value-added food products
• Changes of food quality and components during processing and storage
• Methods of detecting and characterizing microbes and food components.

DEGREE REQUIREMENTS

MASTERS DEGREE REQUIREMENTS

Upon the admission to the program, students must choose and be accepted by a faculty advisor with expertise in their selected sub-discipline. Subsequently, the student’s individual program is developed by the student and his or her advisor and monitored by the advisor and the student’s advisory committee. Final program approval requires endorsement by the Program Chair, with subsequent approval by the Director of Graduate Studies. In consultation with his or her advisor, each student must select which of the two tracks he or she will follow for the two capstone experiences: Sustainable Agriculture and Natural Resources, and Food and Nutrition as described below. Students may apply for degree candidacy and register for capstone credits only after their proposal has been presented to and approved by their advisory committee, as described below.

COURSE REQUIREMENTS (33 CREDIT HOURS)

The University of Guam’s graduate SAFNR Program is designed to produce graduates equipped with essential knowledge and skills. It fosters a commitment to the highest standards of professional integrity in research and application of Agricultural and Natural Resources as well as Food and Nutrition to matters of public interest.

Students are required to take a minimum of 33 credit hours to graduate from the SAFNR program. A thesis with a satisfactory grade point average of 3.0 or higher will confer the Master of Science in Sustainable Agriculture and Natural Resources, and Food and Nutrition.

Core Courses (13 credit hours)

The CORE curriculum for ALL TRACKS consists of four courses totaling 13 credit hours:

<table>
<thead>
<tr>
<th>Course</th>
<th>Course Title</th>
<th>Credits</th>
<th>Term Offered</th>
</tr>
</thead>
<tbody>
<tr>
<td>B503</td>
<td>BIOLOGICAL LITERATURE AND SCIENTIFIC WRITING</td>
<td>2</td>
<td>SPRING ONLY/ALL YEARS</td>
</tr>
<tr>
<td>B507</td>
<td>ADVANCED STATISTICAL METHODS</td>
<td>4</td>
<td>FALL ONLY/ALL YEARS</td>
</tr>
<tr>
<td>AL691</td>
<td>SEMINAR AND CURRENT TOPICS</td>
<td>1</td>
<td>SPRING ONLY/ALL YEARS</td>
</tr>
<tr>
<td>AL695</td>
<td>THESIS</td>
<td>1 - 6</td>
<td>FALL/SPRING/ALL YEARS</td>
</tr>
</tbody>
</table>

Among the core courses which are the tool courses are: Advanced Statistical Methods (B1-507, 4 credit hours), Seminars on current topics (AL 691, 1 credit hour), Biological Literature & Scientific Writing (BI/ EV 503, 2 hours). These core courses equip students with quantitative skills for rigorous experimental design and, interpretation as well as rigorous training in, scientific writing. Students take all four of these core courses, irrespective of which track they choose for their concentration. This suite of courses, thus equips students with the essential knowledge and skills from each of the two tracks that define the ‘SAFNR’. Once students are admitted to the program he or she must demonstrate proficiency in spoken English and presentation skills to the satisfaction of the program admissions committee. If, however, the advisory committee determines that the student would not benefit from additional formal instruction in oral presentation they may waive the Literature & Scientific Presentation (seminar, 1 credit hour) requirement as it is listed above.

Agricultural and Natural Resource Track (9 credit hours)

For the Agricultural and Natural Resource Track students must choose minimum of 9 credit hours from the following courses:
<table>
<thead>
<tr>
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<th>Credits</th>
<th>Term Offered</th>
</tr>
</thead>
<tbody>
<tr>
<td>AL443G</td>
<td>TECHNOLOGIES FOR SUSTAINABLE TROPICAL AGRICULTURE</td>
<td>3</td>
<td>SPRING ONLY/ODD YEARS</td>
</tr>
<tr>
<td>EV512</td>
<td>ENVIRONMENTAL SCIENCE: ECONOMICS-MANAGEMENT-LAW</td>
<td>3</td>
<td>SPRING ONLY/ALL YEARS</td>
</tr>
<tr>
<td>AL536</td>
<td>ADVANCES IN SUSTAINABLE AQUACULTURE</td>
<td>3</td>
<td>FALL ONLY/ODD YEARS</td>
</tr>
<tr>
<td>EV561</td>
<td>URBAN LANDSCAPE MANAGEMENT</td>
<td>3</td>
<td>FALL ONLY/EVEN YEARS</td>
</tr>
<tr>
<td>AL566</td>
<td>AGROECOLOGY FOR ISLAND SUSTAINABILITY</td>
<td>3</td>
<td>SPRING ONLY/EVEN YEARS</td>
</tr>
<tr>
<td>AL570</td>
<td>SUSTAINABLE ANIMAL PRODUCTION SYSTEMS</td>
<td>3</td>
<td>SPRING ONLY/ALL YEARS</td>
</tr>
<tr>
<td>AL581</td>
<td>PRINCIPLE OF PLANT NUTRITION</td>
<td>3</td>
<td>SPRING ONLY/ALL YEARS</td>
</tr>
<tr>
<td>BI419G</td>
<td>BIOCHEMISTRY</td>
<td>3</td>
<td>SPRING ONLY/ALL YEARS</td>
</tr>
<tr>
<td>AL439G</td>
<td>COMMUNITY NUTRITION</td>
<td>3</td>
<td>SPRING ONLY/ODD YEARS</td>
</tr>
<tr>
<td>AL445G</td>
<td>FOOD CHEMISTRY</td>
<td>3</td>
<td>SPRING ONLY/EVEN YEARS</td>
</tr>
<tr>
<td>AL455G</td>
<td>NUTRITIONAL ASSESSMENT</td>
<td>3</td>
<td>FALL ONLY/ODD YEARS</td>
</tr>
<tr>
<td>AL460G</td>
<td>ADVANCED HUMAN NUTRITION</td>
<td>4</td>
<td>FALL ONLY/EVEN YEARS</td>
</tr>
<tr>
<td>AL505</td>
<td>NUTRITIONAL EPIDEMIOLOGY</td>
<td>3</td>
<td>SPRING ONLY/ODD YEARS</td>
</tr>
<tr>
<td>AL542</td>
<td>ADVANCED FOOD SAFETY</td>
<td>3</td>
<td>FALL ONLY/EVEN YEARS</td>
</tr>
<tr>
<td>AL539</td>
<td>PUBLIC HEALTH NUTRITION</td>
<td>3</td>
<td>FALL ONLY/ODD YEARS</td>
</tr>
</tbody>
</table>

**Food and Nutrition Track (9 credit hours)**

For the Food and Nutrition Track students must choose minimum of 9 credit hours from the following courses:

**Elective Courses (11 credit hours)**

Students are to choose a minimum of 11 credit hours from another track or from the following Electives and any SAFNR track credit requirement courses with advisor’s recommendation:

Beyond the core courses, each student must complete at least 11 credit hours from the elective courses related to his or her selected area of concentration and agreed upon by his or her advisor. Elective courses should support the student’s proposed capstone requirement within a chosen research track, as described.

The capstone requirement for the research track is thus a traditional research thesis, for which the student earns 6 hours of academic credit. See General requirements for research thesis. Research thesis in SAFNR program are expected to make an original contribution to the selected sub-discipline and reflect mastery of the knowledge and skills required to successfully pursue of advanced study.
and research in the aforementioned science degree program.

Students are to choose a minimum of 11 credit hours from another track or from the following Electives and any SAFNR track credit requirement courses with advisor's recommendation:

<table>
<thead>
<tr>
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<th>Term Offered</th>
</tr>
</thead>
<tbody>
<tr>
<td>AL451G</td>
<td>AGRICULTURAL BUSINESS MANAGEMENT</td>
<td>3</td>
<td>SPRING ONLY/ ODD YEARS</td>
</tr>
<tr>
<td>MI501</td>
<td>PEOPLES AND CULTURES OF MICRO</td>
<td>3</td>
<td>FALL ONLY/ ALL YEARS</td>
</tr>
<tr>
<td>EV535</td>
<td>TROPICAL CLIMATE &amp; CLIMATE VARIABILITY</td>
<td>3</td>
<td>FALL ONLY/ EVEN YEARS</td>
</tr>
<tr>
<td>AL481G</td>
<td>ENVIRONMENTAL SOIL SCIENCE</td>
<td>3</td>
<td>SPRING ONLY/ ODD YEARS</td>
</tr>
<tr>
<td>AL481L/G</td>
<td>ENVIRONMENTAL SOIL SCIENCE LABORATORY</td>
<td>1</td>
<td>SPRING ONLY/ ODD YEARS</td>
</tr>
<tr>
<td>HS405G</td>
<td>EPIDEMIOLOGY</td>
<td>3</td>
<td>AS REQUIRED/ AS REQUIRED</td>
</tr>
<tr>
<td>BI425G</td>
<td>MOLECULAR MEDICINE</td>
<td>3</td>
<td>SPRING ONLY/ AS REQUIRED</td>
</tr>
<tr>
<td>MI514</td>
<td>HEALTH AND HUMAN ADAPTATION IN MICRONESIA</td>
<td>3</td>
<td>SPRING ONLY/ ODD YEARS</td>
</tr>
<tr>
<td>AL698</td>
<td>INTERNSHIP IN SUSTAINABLE AGRICULTURE, FOOD AND NATURAL RESOURCES</td>
<td>1 - 3</td>
<td>FALL/SPRING/ ALL YEARS</td>
</tr>
<tr>
<td>AL692</td>
<td>TEACHING/ RESEARCH ASSISTANTSHIP</td>
<td>1</td>
<td>FALL/SPRING/ ALL YEARS</td>
</tr>
</tbody>
</table>
GRADUATE CERTIFICATE PROGRAM

(15 CREDIT HOURS)

The Graduate Program in Sustainable Agriculture, Food and Natural Resources (SAFNR) also offers a Graduate Certificate in different concentrations to students who have successfully completed a total of 15 credit hours with a satisfactory grade point average of 3.0 or higher. For more information please refer to the program’s website or email at safnr@triton.uog.edu.

Graduate Certificates include:

1. Graduate Certificate in Island Sustainability
2. Graduate Certificate in International Agriculture
3. Graduate Certificate in Agriculture & Natural Resources
4. Graduate Certificate in Tropical Horticulture
5. Graduate Certificate in Food & Technology

Interested students should check with their advisors for course selections.

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