Scientific Solutions for Society (SS4S)

Graduate and Professional Certification: Sustainable Ecosystem Management

> *We offer an 'Agriculture Management' specialization but we anticipate that additional ecosystems* (water, forest, urban, ocean) and their management will be added as interests, needs, and expertise allow.

Agriculture (Soil and Crop) Management Specialization –

Goals & Mission Statement of Specialization:

- Learn to understand ecosystem management, identify potential problems, develop sustainable solutions, and use appropriate state-of-the art tools to do so sustainably for the benefit of society and future generations.
    - Agriculture demands a significant share of human and natural systems as well as financial capital throughout the world. Consequently, it is critical that members of society understand the broad impacts of the agriculture system in order to create effective policies, adapt to sustainable and/or necessary change, and foresee market and other problems while researching possible solutions.
    - Students will engage in ethical thought by systematizing, defending, and recommending concepts of right and wrong behavior throughout the certificate courses.

Core Competencies

Students will have acquired experience in the following competencies after completion of this specialization:

- Experience in sustainable agriculture management in areas encompassing agriculture systems analysis, community development, public policy, and farm production and management.
- Students will gain a broad and interdisciplinary understanding of critical themes and concepts related to the social, political, economic, environmental, and cultural issues of contemporary food and agriculture systems both domestically and internationally.
- Students will gain knowledge, skills, and state-of-the-art methods that contribute to innovative solutions to pressing food and agriculture challenges.

Specialization Coursework

The Agriculture Management specialization requires that students complete three courses from a list of electives that specially focus on agriculture management:

Agriculture Economics (Macro and Micro)

Sustainable Food Systems Analysis, Evaluation and Management

Sustainable Agrosystems: Challenges, Innovation and Entrepreneurship

Field Study in Soil Ecology, Health, and Management

Future Scenarios for Global Food Security

Other Electives

- Ecosystem Management in a Changing World
- Scientific and Technological Advancements in Agriculture
- Sustainable Food Production
- Plant Pathology and Pest Management
- Sociology of Agriculture: Income Inequality and Food
- Agricultural Planning and Policy
- Food Law and Policy

Teaching Philosophy

- **Systems Approach:** Food systems are essential for each living entity throughout the world and yet systems vary widely geographically, economically and culturally.. Understanding of the social (economic, cultural, political…), environmental, geographic limitations and opportunities of a given food system is essential to ensure optimal and sustained resource management. A systems approach naturally encompasses the inclusion of humanistic considerations in the context of any ecosystem management need and/or identification and is transdisciplinary by its nature.
- **Design thinking** is an iterative process used extensively to identify real and/or potential challenges that need to be addressed in an ecosystem to understand the users and other stakeholders; challenge assumptions; and redefine problems in an attempt to identify alternative strategies and solutions that might not be instantly apparent with our initial level of understanding. Design Thinking also provides a solution-based approach to problem solving as well as a collection of hands-on methods for innovation.
- **Applied learning**: Students within the ecosystem management specialization are exposed to numerous *real-world* scenarios, guest speakers, and field work to ensure they gain experience applying theoretical knowledge in real world situations.
- **Case Studies**: Students learn best when learning is placed within a familiar context, thus teaching methods involving case studies and an *integrated* approach to learning will be frequently utilized.
- **Sustainable orientation:** Processes, challenges and their proposed solutions to agriculture management will be evaluated in terms of how fully they ensure and focus

on long-term resource sustainability solutions for the agricultural industry now and for future generations.

Assessment

- Tracking participant knowledge, and understanding of sustainable management via frequent surveys and self reflections in program portfolios.
- Assessing participant knowledge, use, and application of traditional and state-of-the-art technologies in sustainable agriculture management;
- Evidence (tests, practice and project evaluations) of understanding historical, current, and future agriculture system challenges, opportunities, and innovations at the local to global scale, and designing policies, practices, and solutions sustainably that address limitations or necessary change for the benefit of society.
- After completion of the certificate, students will be followed and tracked by an annual survey. A student-centered database with career data will be the outcome to assess job placement and income data.