

TO: The University of the Virgin Islands Curriculum Committee

FROM: Dr. Usman Adamu, Dean/Director
School of Agriculture

Annette A. James, Ph.D.
Chair, Interim Curriculum Committee, School of Agriculture

DATE: March 26, 2021

REQUEST: Approval for a New Associate of Applied Science: Agroecology

ASSOCIATE OF APPLIED SCIENCE DEGREE JUSTIFICATION (RATIONALE):

Agroecology is defined as “the integration of ecology in agriculture and food systems, encompassing ecological, economic, and social dimensions” (Francis et al., 2003). It is an integrated approach that applies ecological and social concepts and principles to the design and management of food and agricultural systems. It seeks to enhance the interactions between plants, animals, humans and the environment while taking into consideration the social aspects that need to be addressed for a sustainable and fair food system (FAO, 2015).

Agroecology provides the basic ecological principles that are both productive and natural resource conserving, and that are also culturally sensitive, socially just, and economically viable (Altieri, 1995). It plays an important role in contributing to the eradication of hunger and extreme poverty, and as a means to facilitate the transition to more productive, sustainable and inclusive food systems. Creating a greater awareness of agroecology and its advantages is an important step to help policymakers, farmers and researchers to apply this approach to achieve a world without hunger (FAO, 2020). This interdisciplinary program is aimed at providing students with an opportunity to learn problems and issues that emerge from the interface between agriculture, natural ecosystems and urban areas. Students will gain an appreciation of the influence of traditional and modern industrial agricultural systems on natural ecosystems and human environment, as well as ecological and developmental pressure agriculture faces. Students will learn to analyze changes that are necessary within agriculture to make it ecologically sustainable and community-supported using an ecological and social problem-solving approach. The program includes farm- and field-level experiential learning through internships, field demonstrations and minor experiments.

Demand for graduates in agriculture is stronger than ever, especially for those that have the scientific knowledge and experiences in developing sustainable solutions for the agricultural and food system challenges. Careers are available inside and outside the Virgin Islands for graduates in agriculture and agriculture related disciplines, among them, include but not limited to, the following: Financial and Policy Analyst, Crop Consultant, Cooperative Extension Educator, Loan/Credit Office, Extension Agent and Specialist, Teacher Educator, Organic Farm Certification Specialist, Small Farm Managers, Conservation and Wildlife Managers, Soil Scientist, Soil Conservation Specialist, and Water Quality Specialist. As of March 2021, the average annual pay for an Agroecology employee in the United States is \$51,826 a year. While ZipRecruiter is seeing annual salaries as high as \$122,000 and as low as \$17,500, the majority of Agroecology salaries currently range between \$29,500 to \$61,000 with top earners making \$96,500 annually across the United States. The average pay range for an Agroecologist varies greatly (by as much as \$31,500), which suggests there may be many opportunities for advancement and increased pay based on skill level, location and years of experience.

There is a clear need for the Virgin Islands to enhance food production in order to better ensure food security, as well as diversify the economic base for the Virgin Islands. To achieve this, there is a need for both research and education in the area of Agriculture/Horticulture and Agribusiness. The University of the Virgin Islands is poised to take on this challenge by building on its existing strengths in research and outreach in agriculture to formalize the training and education for greater success in creating future leaders in all areas of the agriculture sector.

APPROVALS:

The proposal has been reviewed, discussed, and approved by the Interim Agriculture Curriculum Committee of the School of Agriculture (SOA) and the seven full-time voting faculty members of the UVI Agricultural Experiment Station (AES) and the Cooperative Extension Service (CES) for Spring 2021. Approved by the Interim Curriculum Committee on March 19, 2021 by a vote of 8 in favor, 0 opposed, and 2 abstentions. Approved by the SOA Voting Faculty Members on March 28, 2021 by a vote of 10 in favor, 0 opposed, and 0 abstentions.

Approved by UVI Curriculum committee 15APR 2021

Approved by UVI faculty 22 APR2021

DETAILED DESCRIPTION OF THE PROGRAM:

The Associate of Applied Science degree in Agroecology will investigate both the science and social impact of agroecology in the tropics. The terms agroecology and sustainable agriculture will be explained in detail and defined, and applications of the agroecological perspective to the ecosystems and agriculture unique to the tropics will be discussed. This is an interdisciplinary program; a wide variety of topics and disciplines will be involved.

A total of 61 to 63 credit hours are required for completion of the Associate of Applied Science Degree. It entails General Education, Required, and Elective Courses. The General Education component will include (a). Freshman Development Courses; (b). Humanities; c. Mathematics and /or Science; d. Social Sciences and e. English Proficiency and Literacy Examinations are also mandated. Students will be expected to complete 9 required courses and 1 elective courses, a total of 30 and 3-4 credit hours, respectively. All the required courses will be available for class delivery within the School of Agriculture, except ENV 200 and BIO 223. Most of the required courses will consist of a Lab component designed to reinforce knowledge communicated in the classroom and provide the necessary experiential skills necessary for completion of program. The Associate of Applied Science degree should be completed in two years through a combination of face-to-face, hybrid, and online classes.

ASSOCIATE OF APPLIED SCIENCE DEGREE OBJECTIVES:

Upon completion of the Associate of Applied Science Degree in Agroecology students will be able to:

1. Define and interpret the meaning and application of the concept of agroecology.
2. Adapt the agroecological perspective to the tropics and to the Caribbean context.
3. Integrate the multiple perspectives inherent in agroecology, including social and political dimensions.
4. Assess the importance of agroecology to the future of human communities.
5. Determine the wider implications of agricultural land uses to other areas of human life and the environment.
6. Outline “systems theory” and “systems thinking” to gain appreciation for the holistic connections between sub-disciplines within agriculture, as well as disciplines and activities outside the agricultural world.

7. Review the interconnections in tropical agroecology with other disciplines, courses, and research represented at UVI.
8. Propose potential applications of an agroecological approach to the betterment of the Virgin Islands.

REQUIRED COURSES:

1. **AGR 101.** Introduction to Agriculture. Definition of agriculture; types of agricultural enterprises and practices and factors regulating them; agricultural history and development in the Caribbean; influences of the environment and water cycle on agriculture; the nature of the weather cycle and climate. The climates of the Caribbean area and their influence on agriculture, adaption of crops and livestock; soils, the future of world agriculture. 3 credits.
2. **AGR 202.** Agronomy. Study of crop plants in relation the environment, production, harvest practices, group classification. Discussion of soil sciences, properties and use, growth and structure of roots, water-use cropping practices, seedbed preparation. Three lectures, one laboratory period per week. Prerequisites: Agriculture 101 and Biology 142. 4 credits.
3. **AGR 1**.** Plant Science. This course provides an introduction to various aspects of plants including growth strategies, cellular makeup, genetics, and reproduction. This course will focus on the introduction to plant origin, classification, morphology, and basic plant growth processes. Emphasis will be on the various plant parts, functions, and reproductive structures. Basic principles will be illustrated by looking at both agronomic and horticulture crops. The relationship between plants and people, plant morphology, physiology, plant production, the environment, soil, and other related areas will also be evaluated. The Plant Science laboratories will provide opportunities for hands-on application of concepts of plant science through the use of basic plant science research and production practices. Labs will entail plant growth and development of Monocot and Dicot plants; basic plant anatomy and growth stages; methods of plant reproduction and seed production; basic plant genetics and plant physiology; and identification of uses of crops grown in the Caribbean. 3 credits.
4. **AGR 2**.** Tropical Agroecology. An overview of the science of agroecology as it relates to tropical regions, with emphasis on small island agroecology. This course will investigate both the science and social impact of agroecology in the tropics. The terms agroecology and sustainable agriculture will be explained in detail and defined, and applications of the agroecological perspective to the

ecosystems and agriculture unique to the tropics will be discussed. This is an interdisciplinary course; a wide variety of topics and disciplines will be involved in the course material. The course consists of 3-hours lecture. 3 credits.

5. **ENV 200.** Introduction to Environmental Science and Policy. A survey course designed as an introduction to the natural environment, human interactions impacting these systems, and the environmental policies that govern those interactions. The course will cover issues at local, regional, and global scales. Major topics include: human population growth, energy, climate change, agriculture, ecosystems, economics, US environmental policy, among others. Prerequisites: any course in BIO, CHE, CSC, MBI, MSC, NSC, PHY, SCI. 3 credits.
AGR 2.** Soil Science. . Soil itself will be defined, and the various physical, chemical, and biological aspects of soil will be introduced. The distribution of soil types geographically, the importance of soil ecology, and the status of soil as a non-renewable resource will also be covered in this course. The course consists of two hours' lecture and three hours of field lab weekly. Prerequisite: CHE 111. 4 credits.
6. **AGR 2**.** Integrated Pest Management. This course identifies and assesses the basic concepts, principles, and components including anticipation, prevention, observation and intervention involved in integrated pest management in fields and greenhouses. It covers an ecosystem-based strategy that focuses on long-term prevention of pests or their damage through a combination of techniques such as biological control, habitat manipulation, modification of cultural practices, and use of resistant varieties. Pesticide options will be discussed with timing and safe handling, storage, drift, safety, environment, residues on produce, legislation and dose calculation. Hands-on activities will reinforce the theoretical principles taught in the classroom. 3 credits.
7. **BIO 223.** Ecology. Modern concepts of ecology. Structure and function at various levels of organization in ecosystems will be emphasized. Field and laboratory studies utilize local environments. Prerequisite: BIO 142. 4 credits.
8. **AGR 2**.** Agriculture Internship. The Internship in Agriculture is a form of experiential learning that integrates knowledge and theory learned in the classroom with practical application and skills development in a professional setting. This internship course gives students the opportunity to gain valuable applied experience and make connections in professional fields they are considering for career paths; and give employers the opportunity to guide and evaluate talent. 3 credits.

ELECTIVE COURSES

1. **AGR 203.** Farm Management and Planning. Principles of farm economics and accounting. Analysis, planning and control of the farm business. Economics of resources use and farm enterprises. A farm plan project will be required. Three lectures, and one laboratory period per week. Prerequisite: AGR 101. 4 credits.
2. **AGR 206.** Animal Science. A study of livestock production in warm climates, principles of animal breeding, anatomy and physiology of reproduction, principles of nutrition and livestock management. Introduction to ichthyology, water quality parameters for salt and freshwater fisheries and fish culture. Prerequisites: AGR 101 and BIO 142. 4 credits.
3. **AGR 1**.** Landscape Design and Management Landscape Design and Management. This course dives deeper into landscape design and management. Students will learn the importance of soil and its interaction with plants. The course will explore landscape site evaluation and cover technical topics of turfgrass selection and installation, installing landscape plants, proper pruning, irrigation, greenhouse management, pests and disease identification and control, and conclude with sustainable landscape design. 3 credits.
4. **AGR 1**.** General Horticulture. Introduction to principles and practices of horticulture with emphases on the botanical concepts, production & management practices, propagation, plant protection, and harvesting of fruits, vegetables, herbs, & flowers under indoor and outdoor conditions. This course also encompasses the new-age specialty horticultural systems, landscape management practices, and career opportunities in the horticultural industry. 3 credits.

REQUIRED RESOURCES:

The School of Agriculture has received funding and has begun recruitment for five new faculties in agriculture. Additionally, there is funding for equipment (100,000 per year) which will be utilized to begin the development of the laboratories and provide for equipment. Total, there is approximately \$990,000 allocated for the agriculture programs for faculty, administration, and clerical staff.

IMPLICATIONS FOR GENERAL EDUCATION REQUIREMENTS:

none

REFERENCES:

1. Altieri, M.A.: 1995, 'Agroecology: The Science of Sustainable Agriculture. Boulder, Westview Press.
2. FAO. Org. 2015. The 10 Elements of Agroecology. Guiding the Transition to Sustainable Food and Agricultural Systems.
3. FAO.Org. 2020. Agroecology Knowledge Hub. Database-<http://www.fao.org/agroecology/database>.
4. Francis, C., Lieblein, G., Gliessman, S., Breland, T. A., Creamer, N., Harwood, R., & Poincelot, R. (2003). Agroecology: The ecology of food systems. *Journal of sustainable agriculture*, 22(3), 99-118.

Associate of Applied Science Degree: Agroecology (61-63 Credits)

Course Requirements	Credits
Courses that satisfy general education requirements	Total 28-29
A. Freshman Development Seminar (FDS)*	0-1
a. *Required for all freshman students matriculating with less than 24 credits	
B. Humanities	9
a. COM 119 Interpersonal Communication & Leadership Skills	3
b. ENG 120 English Composition	3
c. ENG 201 Research & Applied Writing	3
C. Mathematics and/or Science	16
a. MAT 140 College Algebra with Application OR MAT 143 PreCalculus Algebra, OR exemption based on placement by the Department of Mathematical Sciences	4
b. BIO 141-142 General Biology I-II	8
CHE 111 Principles of Chemistry	4
D. Social Sciences	3
a. SSC100 An Introduction to the Social Sciences	3
E. Other Requirements	
a. English Proficiency Examination	
b. Computer Literacy Examination	
Required Courses for Agroecology:	Total 30
1. AGR 101 Introduction to Agriculture	3
2. AGR 202 Agronomy	4
3. AGR 1** Plant Science	3
4. AGR 2** Tropical Agroecology	3
5. ENV 200 Introduction to Environmental Science & Policy	3
6. AGR 2** Soil Science	4
7. AGR 2** Integrated Pest Management	3
8. BIO 223 Ecology	4
9. AGR 2** Agriculture Internship	3
Elective Courses for Agroecology (take 3 or 4 credits course)	Total 3 - 4
1. AGR 203 Farm Management and Planning	4
2. AGR 206 Animal Science	4
3. AGR 1** Landscape Design and Management	3
4. AGR 1** General Horticulture	3
Grand Total	61 - 63

Degree Plan for AAS in Agroecology

FIRST YEAR			
	Course Number	Course Name	Credit Hours
Semester 1	FDS*	Freshman Development Seminar	0-1
	COM 119	Interpersonal Communication & Leadership Skills	3
	ENG 120	English Composition	3
	BIO 141	General Biology 1	4
	MAT 140 or MAT 143	College Algebra with Application or PreCalculus Algebra	4
			Total
Semester 2	ENG 201	Research & Applied Writing	3
	SSC100	An Introduction to the Social Sciences	3
	BIO 142	General Biology II	4
	AGR 101	Introduction to Agriculture	3
	CHE 111	Principles of Chemistry for the Life Sciences	4
		Total	17
SECOND YEAR			
	Course Number	Course Name	Credit Hours
Semester 3	AGR 1**	Plant Science	3
	ENV 200	Introduction to Environmental Science and Policy	3
	AGR 2**	Tropical Agroecology	3
	AGR 2**	Soil Science	4
	AGR 2**	Integrated Pest Management	3
			Total
Semester 4	BIO 223	Ecology	4
	AGR 202	Agronomy	4
	AGR 2**	Agriculture Internship	3
	AGR 203 or AGR 206 or AGR 1** or AGR 1**	Farm Management and Planning Animal Science Landscape Design and management, General Horticulture	3-4
		Total	14 – 15

CATALOG CHANGES

P70 add section for School of Agriculture

SCHOOL OF AGRICULTURE

Maybe some description of the School should go here

Agroecology major

The Associate of Applied Science degree in Agroecology will investigate both the science and social impact of agroecology in the tropics. The terms agroecology and sustainable agriculture will be explained in detail and defined, and applications of the agroecological perspective to the ecosystems and agriculture unique to the tropics will be discussed. This is an interdisciplinary program; a wide variety of topics and disciplines will be involved.

Most of the required courses will consist of a lab component designed to reinforce knowledge communicated in the classroom, and provide the necessary experiential skills necessary for completion of program. The Associate of Applied Science degree should be completed in two years through a combination of face-to-face, hybrid, and online classes.

More [Description of program?](#)

	Credits
A. Freshman Development Seminar (FDS)*	1
*Required for all freshman students matriculating with less than 24 credits	
B. HUMANITIES	
COM 119 Interpersonal Communication & Leadership Skills	3
ENG 120 English Composition	3
ENG 201 Research & Applied Writing	3
C. MATHEMATICS AND/OR SCIENCE	
MAT 140 College Algebra with Application	
or MAT 143 PreCalculus Algebra,	
or exemption based on placement by the Department of Mathematical Sciences	
BIO 141-142 General Biology I-II	4-4
CHE 111 Principles of Chemistry	4
BIO 223 Ecology	4
ENV 200 Introduction to Environmental Science and Policy	3
D. SOCIAL SCIENCES	

SSC 100	Introduction to the Social Sciences	3
---------	-------------------------------------	---

E. REQUIRED COURSES FOR AGROECOLOGY:

AGR 101	Introduction to Agriculture	3
AGR 1**	Plant Science	3
AGR 2**	Tropical Agroecology	3
AGR 202	Agronomy	4
AGR 2**	Integrated Pest Management	3
AGR 2**	Soil Science	4
AGR 2**	Agriculture Internship	3

F. Students must choose a minimum 3 credits of elective courses in Agriculture

AGR 1**	Landscape Design and Management	3
AGR 1**	General Horticulture	3
AGR 203	Farm Management and Planning	4
AGR 206	Animal Science	4