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: Horticulture

ASSOCIATE OF APPLIED SCIENCE JUSTIFICATION (RATIONALE):

According to Liberty Hyde Bailey (1858-1954), an American scholar who can be considered as one of the Fathers of Horticultural Science, "Horticulture is the growing of flowers, fruits and vegetables and of plants for ornament and fancy" (Ohio State University n.d.). Horticultural science is the only plant science that incorporates both the science and aesthetics of plants. It is the science and art of producing edible fruits, vegetables, flowers, herbs, and ornamental plants, improving, and commercializing them. Horticulture impacts our lives on a daily basis by providing nutritious fruits and vegetables, offering visual enjoyment, and promoting recreational activities (ashs.org). The human body needs vitamins, proteins, mineral and also carbohydrates in their meal or diet and the consumption of fruits and vegetables meet this need.

The Horticulture sector is an important entity which provides products for food and foreign exchange and therefore, a significant source of income. Plants are used as medicine to treat or cure diseases and the consumption of green vegetables and fresh fruits and juices also prevent us from different chronic or acute disease. It is more profitable since the average income per unit area is more in horticultural crops than agricultural crops. Through the horticulture sector, employment is also generated in doing different field operations like fruit picking, harvesting, grading, packing, and selling. Farmers growing high-value crops, such as fruits, vegetables, flowers or herbs, consistently earn more than those growing other commodities. Horticulture can be an engine for agricultural and economic diversification. The importance of horticulture in improving the productivity of land, creating employment, improving economic conditions of the farmers and entrepreneurs, enhancing exports and, above all, providing nutritional security to people, is now widely acknowledged. The average pay for a Horticulturist is $69,057 a year and $33 an hour in the United States. The average salary range for a Horticulturist is between $49,458 and $85,217 (findanyanswer, 2020). Jobs

in horticulture are available: an average of 35,400 new U.S. graduates with expertise in food, agriculture, renewable natural resources, or the environment, are expected to fill only 61% of the expected 57,900 average annual openings (Goecker et al., 2015). Concurrently, the horticulture industry shows a shortage of trained professionals with a gap between students graduating and employees needed for many areas of horticulture (Dickey, 2014; Needleman, 2014). Leadership in American Society for Horticulture Science (ASHS) realized the limited public, especially youth, awareness of horticulture and careers in horticulture and the lack of trained professionals. Several horticultural administrators at land-grant universities also recognized this limited perception and agreed to financially support this initiative (Meyer et., al. 2016). Careers are available inside and outside the Virgin Islands for the graduates in agriculture and agriculture related disciplines, among them, include but not limited to, the following: Financial and Policy Analyst, Loan/Credit Office, Extension Agent and Specialist, Teacher Educator, Environmental Health Inspector, Industrial Safety Inspector, Famer/Grower, Farm Manager, Water Quality Specialist, Natural Resources Conservationist, Food Safety Inspector, Horticulturalist, Land-Scape Architect, and Rural and Community Development Specialists.

The Associate of Applied Science (AAS) degree in Horticulture at the University of the Virgin Islands (UVI) is designed to prepare students with the knowledge and skills for a successful career in the horticulture industry. The coursework, in addition to providing a solid science foundation for propagation, production, and managing plants, also provides students with vital hands-on learning experience, both in controlled environments and the field. Courses in soils, plant diseases, vegetable production and tropical horticulture are integral parts of the program. Entry-level jobs are available with state and city park departments, nurseries, landscape contracting firms, golf courses and retail sales. Students will also acquire the necessary skills for advancement in their career field, self-employment, and transfer to a Bachelor of Science degree program. Industry fields include landscape design, landscape and grounds maintenance, floral design, greenhouse and garden center management and sustainable horticulture. Students also will develop skills for lifelong learning.

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 Horticulture is designed to prepare students with the knowledge and skills for a successful career in the horticulture industry. The coursework, in addition to providing a solid science foundation for propagation, production, and managing plants, also provides students with critical hands-on experience, both in the Lab and the field. Courses in Soils, Plant Diseases, Vegetable Production, and Tropical Horticulture are integral components of the program. On completion of this program students have the opportunity or option to transfer to a Bachelor of Science program in areas such as Horticulture, Plant and Soil Sciences, and Agri-Business.

A total of 64 to 65 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 2 elective courses, a total of 29 and 7 credit hours, respectively. All the required courses will be available for class delivery within the School of Agriculture. 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 Horticulture students will be able to:

1. Examine the fundamentals of plant structure, growth, development, and the principles and methods of growing various ornamental, fruit, and vegetable crops.
2. Propagate plant materials using various sexual and asexual propagation methods.
3. Understand and apply the basic concepts, principles, and components including anticipation, prevention, observation, and intervention involved in integrated pest management in fields and greenhouses.
4. Identify, utilize, and grow an array of plant material in a landscape, greenhouse or garden center setting.
5. Define and identify soil types and the factors contributing to soil types and soil properties.
6. Collect soil samples and analyze soil test results for proper plant selection or changes to soil conditions.
7. Analyze, diagnose, and make decisions related to management of a farm business.
8. Develop a business plan for a small green industry related business.
9. Recognize the effects of temperature, light intensity and light quality on growth and development of horticultural crops.
10. Diagnose common macro- and micro-nutrient deficiencies and how to correct them.
11. Explain current trends in biotechnology of horticulture crops.
12. Identify and examine basic horticultural practices such as grafting, pruning, pest management and cultivating crops that are of economic interest in the tropics.
13. Describe the principles of vegetable production with emphasis on sustainable production practices, market outlets, business aspects, and risk management.
14. Explain the principles and practices of small fruit, tree fruit, and nut culture and production.
15. Participate in experiential learning activities (Labs) that integrates knowledge and theory learned in the classroom

16. Identify and list the various career paths that horticultural students can pursue on completion of this program.

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 influences on agriculture. Adaption of crops and livestock; soils, the future of world agriculture. 3 credits.

2. **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.

3. **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.

4. **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. Perquisite: AGR 101. 4 credits.

5. **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 field lab weekly. Prerequisite: CHE 111. 4 credits.

6. **AGR 1**.** 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. **AGR 2**** Vegetable Production. This course entails the production principles and cultural practices involved in the growing of vegetable crops. Principles of vegetable production with emphasis on sustainable production practices, market outlets, business aspects, and risk management. Topics will include crop classification and rotation; planting methods; crop climatic conditions, growth, and development; soil, water, and pest management; cover cropping; season extension strategies; harvest and postharvest management and marketing. Involves visits to farmer's fields to observe/experience their production enterprises. Students will be engaged in vegetable production Labs - hands-on training in the area of vegetable crop production. 3 credits.'

8. **AGR 2**.** Fruit Production. Principles and practices of small fruit, tree fruit, and nut culture and production. Morphology, physiology of growth and development, plant establishment, pest management, pruning, training, harvesting, storage, and marketing of commercial temperate fruit and nut crops. Emphasis on sustainable practices. Participation in practical exercises and local field trips is required. 3 credits.

9. **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 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.

2. **AGR 204.** Tropical Horticulture. Study of how plant and man interact in the tropics. Types of tropical fruits, vegetables, and ornamental plants with emphasis on history, distribution, importance, adaptation and use. Production practices. marketing techniques and special problems will be discussed. Each student will be required to grow a garden. Three lectures, one laboratory period per week. Prerequisites: Agriculture 101 and Biology 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 2**.** Plant Propagation. A study of the principles and practices of sexual and asexual propagation of plants used in horticulture. Propagation by seed as well as vegetative propagation including cutting, grafting, budding, layering, division, separation, and tissue culture will be discussed. Impacts of environmental factors on plant propagation will also be explained. These principles will be reinforced in Labs and field trips. 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. Dickey, M. 2014 NCNLA President's message *Nursery Landscape Notes* 84 3 5 7.
2. Goecker, A., Smith, E., Marcos Fernandez, J., Ali, R. & Goetz Theller, R. 2015 Employment opportunities for college graduates in food, agriculture, renewable natural resources, and the environment, United States, 2015-2020. 28 Oct. 2015. https://www.purdue.edu/usda/employment.
3. Meyer H. Mary H. Meyer, Douglas Needham , John Dole, Brain Trader, Jennifer Fox , Marnie Conley, Michael Neff, and Jean Shaw. 2016. Importance of Horticulture and Perception as a Career. https://journals.ashs.org/horttech/view/journals/horttech/26/2/article-p114.xml.
4. Needleman, S. 2014 Skilled labor shortage means many jobs go unfilled. 28 Oct. 2015.
5. https://journals.ashs.org/horttech/view/journals/horttech/26/2/article-p114.xml.
6. OHIO STATE UNIVERSITY. n.d. Notes on what is horticulture. Retrieved Oct. 8, 2011 from http://hcs.osu.edu/hcs/tmi/hcs210/WhatsHort/BaileyHort-1.html.
7. What is the horticulture industry and why is it important? 2020. https://findanyanswer.com/what-is-the-horticulture-industry-why-is-it-importantction.

Associate of Applied Science Degree: Horticulture (64 - 65 Credits)

Course Requirements	Credits
Courses that may fulfill 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
CHEM 111 Principles of Chemistry for the Life Sciences	4
D. **Social Sciences**	**3**
a. SSC 100 An introduction to the Social Sciences	3
E. **Other Requirements**	
a. **English Proficiency Examination**	
b. **Computer Literacy Examination**	
Required Courses for Horticulture:	**Total 29**
1. AGR 101 Introduction to Agriculture	3
2. AGR 1**Plant Science	3
3. AGR 1**General Horticulture	3
4. AGR 203 Farm Management and Planning	4
5. AGR 2**Soil Science	4
6. AGR 2**Integrated Pest Management	3
7. AGR 2**Vegetable Production	3
8. AGR 2** Fruit Production	3
9. AGR 2**Agriculture Internship	3
Elective Courses for Horticulture (take 3 & 4 credit courses)	**Total 7**
1. AGR 2**Tropical Agroecology	3
2. AGR 204 Tropical Horticulture	4
3. AGR 1** Landscape Design and Management	3
4. AGR 2** Plant Propagation	3
Grand Total	**64 - 65**

Degree Plan for AAS in Horticulture

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 I	4
	MAT 140/MAT 143	College Algebra/Pre-Calculus Algebra	4
		Total	**14-15**
Semester 2	AGR 101	Introduction to Agriculture	3
	BIO 142	General Biology II	4
	SSC 100	An Introduction to the Social Sciences	3
	AGR 1**	General Horticulture	3
	CHEM 111	Principles of Chemistry for the Life Sciences	4
		Total	**17**
SECOND YEAR			
	Course Number	**Course Name**	**Credit Hours**
Semester 3	ENG 201	Research & Applied Writing	3
	AGR 2**	Integrated Pest Management	3
	AGR 2**	Soil Science	4
	AGR 2**	Vegetable Production	3
	AGR 1**	Plant Science	3
		Total	**16**
Semester 4	AGR 2**	Fruit Production	3
	AGR 203	Farm Management and Planning	4
	AGR 204	Elective I - Tropical Horticulture	4
	AGR 1**/AGR 2** /AGR 2**	Elective II - Landscape Design and Management /Tropical Agroecology/ Plant Propagation	3
	AGR 2**	Agriculture Internship	3
		Total	**17**

CATALOG CHANGES – on p70, under a new school of agriculture program description add:

Horticulture major

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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.

		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,	4
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 of Chemistry	4
D. SOCIAL SCIENCES		
SSC 100	Introduction to the Social Sciences	3
E. Required Courses for Horticulture:		
AGR 101	Introduction to Agriculture	3
AGR 1**	Plant Science	3
AGR 1**	General Horticulture	3
AGR 2**	Integrated Pest Management	3

AGR 203	Farm Management and Planning	4
AGR 2**	Soil Science	4
AGR 2**	Vegetable Production	3
AGR 2**	Fruit Production	3
AGR 2**	Agriculture Internship	3

F. Students must choose a minimum 7 credits of elective courses in Agriculture

AGR 1**	Landscape Design and Management	3
AGR 2**	Tropical Agroecology	3
AGR 204	Tropical Horticulture	4
AGR 2**	Plant Propagation	3