RESOLUTION TO APPROVE NEW BACHELOR OF SCIENCE IN PLANT SCIENCE AND DISCONTINUE BACHELOR OF SCIENCE IN CROP AND SOIL ENVIRONMENTAL SCIENCES AND BACHELOR OF SCIENCE IN HORTICULTURE

WHEREAS, within the College of Agriculture and Life Sciences, the School of Plant and Environmental Sciences was formed in 2018 from the merger of three departments: Crop and Soil Environmental Science (CSES), Horticulture (HORT), and Plant Pathology, Physiology, and Weed Science (PPWS); and

WHEREAS, the School of Plant and Environmental Sciences now has a broader and more integrated mission than the three previous departments; and

WHEREAS, the faculty determined that merging two degrees: the Bachelor of Science in crop and soil environmental sciences and in the Bachelor of Science in horticulture, into a single Bachelor of Science degree in plant science would best serve the students and provide a unified, integrated curriculum with a wide breadth of subject material and expertise to make graduates of the program additionally competitive for employment in the public and private sectors; and

WHEREAS, the proposed Bachelor of Science in plant science will offer four majors: crop and soil sciences, landscape design and turfgrass science, plant science, and environmental horticulture and will provide discrete and specialized knowledge of a disciplinary or interdisciplinary area to prepare students for graduate school or employment in governmental agencies, agribusiness firms, and biotechnology companies; and

WHEREAS, with strong forecasted employment in the plant and soil science fields, it is anticipated that the new degree and majors in the School of Plant and Environmental Sciences, along with a new and focused recruitment and retention strategy, will significantly increase undergraduate student enrollment; and

WHEREAS, the School of Plant and Environmental Sciences is committed to providing coursework and experiential learning fitting the VT-shaped curriculum to produce graduates with the knowledge, skills, and dispositions of highly qualified plant and soil scientists to fill employment vacancies; and

WHEREAS, no new resources are required to initiate the new Bachelor of Science in plant science; and

WHEREAS, letters of support have been received from all departments with courses in the plant science degree program; and

WHEREAS, the new Bachelor of Science in plant science will be a curriculum that clearly signals the expertise and career focus of plant and soil scientists; and

WHEREAS, the new Bachelor of Science in plant science is anticipated to attract 20 to 30 additional students per year interested in pursuing careers in the plant and soil sciences to Virginia Tech; and

WHEREAS, with the approval of the Bachelor of Science in plant science degree, the Bachelor of Science in crop and soil environmental sciences and Bachelor of Science in horticulture will be discontinued; now

THEREFORE, BE IT RESOLVED that the Bachelor of Science in plant science be approved and the proposal forwarded to the State Council of Higher Education for Virginia (SCHEV) for approval and to the Southern Association of Colleges and Schools Commission on Colleges (SACSCOC) for notification; and that the Bachelor of Science in plant science be effective upon approval by SCHEV; and

BE IT FURTHER RESOLVED that the Bachelor of Science in crop and soil environmental sciences and Bachelor of Science in horticulture be discontinued effective spring 2026, and the proposal forwarded to the State Council of Higher Education for Virginia (SCHEV) for approval, and to the Southern Association of Colleges and Schools Commission on Colleges (SACSCOC) for notification.

RECOMMENDATION:

That the Board of Visitors approve the resolution to approve a new Bachelor of Science degree in plant science and discontinue two degrees: Bachelor of Science in crop and soil environmental sciences, and Bachelor of Science in horticulture.

June 8, 2021

Table of Contents

Description of Proposed Program

Background

Virginia Tech College of Agriculture and Life Sciences requests approval to merge two-degree programs and create a new Bachelor of Science (B.S.) in Plant Science (01.1101). The two programs to be merged include the B.S. in Crop and Soil Environmental Sciences (01.1102) and the B.S. in Horticulture (01.1103). The proposed B.S. in Plant Science would be initiated in Spring 2022 and housed in the School of Plant and Environmental Sciences.

The purpose of the proposed B.S. in Plant Science degree is to train students to improve the productivity, utilization, and sustainability of crops and plants. Students will obtain a thorough grounding through the plant science core in plant biology, genetics, and pathology, as well as in the four major disciplinary areas in plant science (Crop and Soil Sciences, Landscape Design and Turfgrass Science, Plant Science, and Environmental Horticulture) which will enable them to apply this information to improve the quality, quantity, and safety of agricultural products. Graduates of the proposed program will be able to conduct, analyze, and interpret agricultural data to formulate effective questions and strategies to improve the growth and productivity of plants and crops as well as communicate this information effectively to stakeholders and the public.

The proposed degree program will offer four majors: 1) Crop and Soil Sciences, 2) Landscape Design and Turfgrass Science, 3) Plant Science, and 4) Environmental Horticulture. Each major will provide a discrete and specialized knowledge of a disciplinary or interdisciplinary area that will prepare graduates for employment in that field.

The School of Plant and Environmental Sciences (SPES) was formed in July 2018 by merging three departments: Crop and Soil Environmental Sciences, Horticulture, and Plant Pathology, Physiology, and Weed Science. This merger prompted the newly integrated faculty to convene and discuss options for the undergraduate programs, which consisted of three B.S. degrees spanning the three former departments. From these discussions, it was determined that the merger of two degrees, the B.S. in Crop and Soil Environmental Sciences and the B.S. in Horticulture, into one B.S. in Plant Science degree would best serve the students by providing a unified, integrated curriculum with a wider breadth of subject material and expertise that would make graduates of the program more competitive for jobs in the public and private sector. The proposed degree gives students an opportunity to explore the field of plant science as a whole before committing to a specific plant science sub discipline. The unification of its core courses ensures that all students in the plant science program get the foundational knowledge required to excel in the agricultural and plant science fields while providing opportunities for specialization and proficiency in a specific discipline. The proposed B.S. in Plant Science degree program will be the foundation of an exciting and flexible curriculum designed to train a new generation of students to meet the demand of agriculture, the green industry, and general plant sciences.

Degree Programs to be Discontinued

Virginia Tech will discontinue: the B.S. in Crop and Soil Environmental Sciences (01.1102) and the B.S. in Horticulture (01.1103) located in the School of Plant and Environmental Sciences in the College of Agriculture and Life Sciences. Documentation to discontinue these programs is

included with this submission.

Curriculum

The proposed B.S. in Plant Science degree program will require 120 credit hours. The program requires a capstone course. Four majors will be offered: Crop and Soil Sciences, Landscape Design and Turfgrass Science, Plant Science, and Environmental Horticulture.

The core coursework provides the foundational principles of plant biology, genetics, diseases, and disease-causing agents. This knowledge helps students to understand how plants grow and how the physical, chemical, mineralogical, and biological properties of the soil and environment affect crop and plant development and quality. Students will also develop the skills necessary to communicate effectively in professional contexts with technical and non-technical audiences including interpersonal skills needed for group leadership and meeting management.

In the capstone course, students develop an agricultural action plan that explains best management practices for producing a specific crop, managing a particular landscape, protecting soil and water quality, or bringing a new plant product to market. Students also develop and justify an annual budget and maintenance plan for a sports field complex or an annual crop rotation plan of corn, wheat, or soybean. This allows students to refine and practice skills in communication, critical thinking, problem solving, cross functional knowledge, written communication, and team work.

The required majors provide an opportunity to build on a strong foundational plant science core with more specialized knowledge in a disciplinary (or potentially cross disciplinary) area of plant science. Majors in the proposed degree include Crop and Soil Sciences, Landscape Design and Turfgrass Science, Plant Science, and Environmental Horticulture.

One new course was developed for the proposed B.S. in Plant Science degree program. New courses are denoted with an asterisk (*).

Program Requirements

General Education Courses: 45 credit hours
Discourse (3 credits)
ENGL 1105: First-Year Writing (3 credits)
ENGL 1106: First-Year Writing (3 credits)
Critical Thinking in the Humanities (6 credits)
Reasoning in the Social Sciences (3 credits)
AAEC 1005: Economic of the Food and Fiber System (3 credits), *Or*
ECON 2005: Principles of Economics (3 credits)
Reasoning in the Natural Sciences (6 credits)
Quantitative and Computational Thinking (9 credits)
Critique and Practice in Design and the Arts (6 credits)
Critical Analysis of Identity and Equity in the United States (3 credits)

Core Courses: 25 credit hours
ALCE 3624: Communicating Agriculture and Life Sciences in Writing (3 credits), *Or*
ALCE 3634: Communicating Agriculture and Life Sciences in Speaking (3 credits)
ALS 1234: CALS First Year Seminar (1 credit)
BIOL 1105: Principles of Biology (3 credits)
BIOL 1106: Principles of Biology (3 credits)
ENSC 1015: Foundations of Environmental Science (3 credits)
HORT/BIOL 2304: Plant Biology (3 credits)
PPWS 2104: Plants, Genes, and People (3 credits)
PPWS 4104: Plant Pathology (4 credits)

Capstone Course: 2 credit hours
*SPES 4864: Plant Sciences Capstone (2 credits)

Major Areas
Students must choose one of the following majors.

Crop and Soil Sciences Major: 39 credit hours
The proposed major in Crop and Soil Sciences (CSS) prepares students for crop and soil management careers in the private and public sectors. Students in this major learn the principles of soil chemistry and nutrient management, pest management, and planting and harvesting operations to improve growth and yield of large-scale agronomic crops.

Crop and Soil Science Major Core Courses: 21 credit hours
AAEC 2434: Foundations of Agribusiness (3 credits)
CHEM 1045: General Chemistry Laboratory (1 credit)
CHEM 1046: General Chemistry Laboratory (1 credit)
CSES 2444: Agronomic Crops (3 credits)
CSES/ENSC 3114/GEOS 3614: Soils (3 credits)
CSES/ENSC 3124/GEOS 3624: Soils Laboratory (1 credit)
CSES 4144: Plant Breeding and Genetics (3 credits)
CSES 4214: Soil Fertility and Management (3 credits)
ENT 4254: Insect Pest Management (3 credits)

Restricted Electives: 18 credit hours
Students choose a combination of courses that total 18 credits from a restricted list of courses.

AAEC 2104: Personal Financial Planning (3 credits)
AAEC 3004: Agricultural Production and Consumption Economics (3 credits)
AAEC 3314: Environmental Law (3 credits)
AAEC 3504: Marketing Agricultural Products (3 credits)
AAEC 3604: Agricultural Law (3 credits)
ALS 3404: Ecological Agriculture: Theory and Practice (3 credits)
BIOL 2804: Ecology (3 credits)

- Analyze plant and soil samples for pathogens, chemical pesticides/fertilizers.
- Diagnose and identify plant pathogens and methods of treatment.
- Identify weeds, invasive plants, and integrated strategies for their management.
- Sell and service weed management products, including equipment and herbicides.

Environmental Horticulture

- Perform tasks associated with growing fruit, vegetable, and nursery/greenhouse crops.
- Design ornamental plants and plantings to improve indoor and urban environments.
- Consult for botanical gardens and arboreta.
- Manage greenhouses, orchards, nurseries, vineyards, and floral outlets.
- Perform pest scouting, pest diagnosis, and pest remedial actions.
- Buy and sell plants, supplies and equipment for horticultural businesses.
- Educate stakeholders about ornamental plants, fruit and vegetable production principles.

Program Assessment

The School of Plant and Environmental Sciences Undergraduate Curriculum Committee will evaluate the proposed program annually. The first full evaluation would occur in the summer of 2023. The instructor of the Capstone Course will assess student deliverables, the agricultural action plan from the Capstone Course, SPES 4864: Plant Sciences Capstone, to determine the extent to which program learning outcomes are being achieved. The Capstone course uses experiential learning to apply the knowledge and skills obtained during the degree program. The agricultural action plan, in the form of oral and written reports will be used to assess achievement of outcomes. The Capstone course will also allow the instructor to interview each student one on one to gauge student satisfaction with the degree program and specific majors. These findings will be reported to the SPES Undergraduate Curriculum Committee for program assessment.

In addition to annual assessment reports, each academic department at Virginia Tech participates in academic program review approximately every five years. Virginia Tech's Academic Program Review process requires programs to conduct a comprehensive evaluation of their activities. This process provides a mechanism for ongoing, systematic review of academic departments with the explicit purpose of fostering continuous improvement. The review process emphasizes reflection, analysis, conversation, and feedback; an honest assessment of program strengths, weaknesses, and opportunities for improvement; and documentation of resource needs. The results of this process are intended to facilitate a strong vision for the future.

The level of analysis for this review is the academic department inclusive of all degree, certificate, intercollege, and online programs. In addition to reviewing academic programs, departments are asked to provide an overview of the department and information in the following areas: student learning and support; faculty and staff profiles (research/creative activity/scholarly work); teaching, outreach, and international involvement; and inclusion and diversity. The department is expected to discuss its vision for the department over the next five years and include improvement strategies and plans.

As part of the academic program review process, departments complete a self-study report that is reviewed and evaluated by a team of peer reviewers. Reviewers may be internal to Virginia Tech and/or external to Virginia Tech depending upon the department's preferences and resources. Departments are given comprehensive feedback from the review team that includes information on the department's strengths and opportunities for further reflection and action. The next periodic report encompassing this new degree will take place in Spring 2024.

Benchmarks of Success

The proposed B.S. in Plant Science will be considered a success if:

- 75% of students will complete the program in four years
- 85% of graduates surveyed indicate satisfaction with the program quality
- 90% of graduates seeking employment report employment within two years of graduation
- 80% of graduates who intend to pursue additional academic preparation before entering the job market report acceptance to graduate or first professional schools within one year of graduation

All benchmarks will be assessed on an annual basis. If a benchmark is not met, the School of Plant and Environmental Sciences Undergraduate Curriculum Committee will examine the data and determine appropriate strategies to correct any deficiencies. Strategies may include a comprehensive review of the advising approaches and the program coursework to include course sequencing in the plan of study, course content, and the selection of elective courses. For example, if students seeking employment do not meet benchmarks, eliciting targeted feedback from alumni as well as employers who have hired graduates of the proposed degree program will be used for strategic planning for improvement.

Justification for the Proposed Program

Rationale for Proposed Merge Degree Program

The proposed merger of the two undergraduate degree programs into one B.S. in Plant Science is needed at this time to a) simplify communications about the School of Plant and Environmental Sciences degree offerings and b) integrate and organize the curriculum in a more systematic manner appropriate for the plant science discipline.

Combining the two existing degrees into one degree program will simplify communications about the School of Plant and Environmental Sciences undergraduate degree offerings. This will allow the School of Plant and Environmental Sciences to develop a single set of recruitment and admission materials and have a degree program structure that is instantly intelligible to students and parents.

The integration of the core courses in the proposed combined Plant Science degree program ensures that all students will learn the foundation of the basic and applied science components

that are required to excel in the plant science discipline. The combined degree benefits students by exposing them to a wider breadth of subject material and expertise that was not available in the former individual degrees. Both of the former degree programs, the B.S. in Crop and Soil Environmental Sciences and the B.S. in Horticulture, were strongly oriented toward the applied plant sciences. The merged program has purposefully constructed the core coursework to incorporate *both* the basic and applied plant sciences and has organized the majors by basic or applied orientation.

Once students understand the basic and applied aspects of plant science, they are more prepared to choose the appropriate major for their career trajectory. Thus, the proposed merged program represents a way to allow students to identify a general interest in and acquire a foundation of knowledge in the plant science discipline before committing to a basic or applied plant science major. For example, if a student identifies that they are more interested in the basic science aspects of plant science while completing the core coursework, that student may choose the Plant Science major as it is designed from the basic science approach (e.g., predicting plant growth, manipulating crops to resist disease, plant gene editing). Likewise, a student completing the core coursework may find their interest lies in the applied science components of plant science. That student may choose the Crop and Soil Science major as it is designed from the applied science approach (e.g., using soil, irrigation, and pest management techniques to increase yield on large-scale crops).

Student Demand

Formal student demand information was not acquired for the proposed B.S. in Plant Science merged program. Student enrollment in the proposed program will meet or exceed the enrollment in the existing two degree programs that will be discontinued. Faculty from the existing programs will continue to teach courses in the proposed merged program. If enrollment increases, tuition revenues will be deployed to hire additional faculty as required.

Current student demand is very strong. In fall 2019, student headcounts were 68 for the B.S. in Crop and Soil Environmental Sciences and 92 for the B.S. in Horticulture.

Projected Student Enrollment

State Council of Higher Education for Virginia
Summary of Projected Enrollments in Proposed Program

Year 1		Year 2		Year 3		Year 4 **Target Year (2-year institutions)**			Year 5 **Target Year (4-year institutions)**		
2021 - 2022		2022 - 2023		2023 - 2024		2024 - 2025			2025 - 2026		
HDCT 160	FTES 160	HDCT 160	FTES 160	HDCT 160	HDCT 160	FTES 160	HDCT 160	FTES 160	HDCT 160	HDCT 160	FTES 160

Assumptions:

Retention percentage: 90%
Percentage of full-time students 100%
Percentage of part-time students: 0%
Full-time students credit hours per semester: 12
Full-time students graduate in 4 years

Duplication

No public institution in the Commonwealth offers a Bachelor of Science (B.S.) in Plant Science degree program.

Projected Resource Needs for the Proposed Program

Resource Needs

Virginia Tech and the School of Plant and Environmental Sciences have all of the faculty, classified support staff, equipment, library, and other resources necessary to merge the two existing undergraduate programs into the single proposed B.S. in Plant Science. The following categories detail the resources required to operate the program from its initiation in the Spring 2022 semester through the target year 2025-2026. The recommended ratio of student enrollment to faculty effort is one faculty FTE per 18 FTE of enrollment in lower division courses and 11 FTE of enrollment at the upper division. The proposed program will launch with 11.4 faculty FTE and remain 11.4 FTE by the target year of 2025-2026. Tuition generated from the program will be used to initiate and operate the proposed merged program.

Full-time Faculty
No new faculty members will be required to launch or sustain the proposed merged program.

Part-time Faculty
No new faculty members will be required to launch or sustain the proposed merged program.

Adjunct Faculty
Adjunct faculty will not be required to initiate or sustain the proposed merged program.

Graduate Assistants
No new graduate assistants will be required to launch or sustain the proposed merged program.

Classified Positions

No new classified positions will be required to launch or sustain the proposed merged program.

Equipment (including computers)
No new equipment, including computers, will be required to launch or sustain the proposed merged program.

Library
No new library materials will be required to launch and sustain the proposed merged program. The library has sufficient, journals, publications, and electronic resources to support the proposed merged program.

Telecommunications
No new telecommunication resources will be required to launch or sustain the proposed merged program.

Space
No additional space is required to launch or sustain the proposed merged program.

Targeted Financial Aid
No targeted financial aid will be required to launch or sustain the proposed merged program.

Special Tuition or Fee Charges
The College of Agriculture and Life Sciences has a mandatory fee of $750 per student per academic year. Based on the current and projected enrollment, the program will receive $120,000 annually from the college fee.

Other Resources (specify)
No new other resources will be required to launch or sustain the proposed merged program.

Funds to Initiate and Operate the Degree Program

Cost and Funding Sources to Initiate and Operate the Program			
Informational Category		**Program Initiation Year 2020 – 2021**	**Program Full Enrollment Year[1] 2024 – 2025**
1.	Projected Enrollment (Headcount)	160	160
2.	Projected Enrollment (FTE)	160	160
3.	Projected Enrollment Headcount of In-State Students	146	146
4.	Projected Enrollment Headcount of Out-of-State Students	14	14
5.	Estimated Annual Tuition and E&G Fees for In-state Students in the Proposed Program	$2,116,708	$2,116,708
6.	Estimated Annual Tuition and E&G Fees for Out-of-State Students in the Proposed Program	$470,988	$470,988
7.	Projected Total Revenue from Tuition and E&G Fees Due to the Proposed Program	$2,587,696	$2,587,696
8.	Other Funding Sources Dedicated to the Proposed Program (e.g., grant, business entity, private sources)	$0	$0

[1] For the "Full Enrollment Year" use: for associate degrees, initiation year plus 1; for baccalaureate degrees, initiation plus 3; for masters degrees, initiation plus 2; for doctoral degrees, initiation plus 3.

Projected Positions for the Merged Program

	Program initiation year 2021 - 2022		**Target enrollment year 2025 - 2026**	
	Current positions all programs to be merged	**Ongoing and reallocated merged program**	**Added (New)*** merged program**	**Total FTE positions, merged program**
Full-time faculty FTE*	11.00	11.00		11.00
Part-time faculty FTE**	0.40	0.400		0.4
Adjunct faculty	0.00	0.0		0.000
Graduate assistants (HDCT)	8.00	8.00		8.00
Classified positions	0.60	0.6		0.600
TOTAL	20.00	20.00		20.00

* Faculty dedicated to the program. ** Faculty effort can be in the department or split with another unit. *** Added **after** initiation year and up through target enrollment year.

Certification Statements

1. A request of any kind will be submitted to the General Assembly for funds to initiate and/or maintain the proposed degree program.

   Yes ☐

   No ☒

   If "Yes" is checked, include narrative text to describe: when the request will be made, how much will be requested, what the funds will be used for, and what will be done if the request is not fulfilled.

2. The proposed degree program is included in the institution's most recent six-year plan.

   Yes ☒

   No ☐

   If "No" is checked, include narrative text to explain why the program is being advanced at the present time despite not being included in the six-year plan.

3. The institution's governing board has been provided information regarding duplication (if applicable) and labor market projections as part of its approval action.

   Yes ☒

   No ☐

   If "No" is checked, include narrative text to explain why the governing board has not been provided the information.

The institution's Chief Academic Officer attests to the accuracy of the above statements

Cyril R. Clarke, Executive Vice President and Provost

Name (Printed)

Signature Date

Appendices

Appendix A
Sample Plans of Study

B.S in Plant Science, Major: Crop and Soil Sciences

Freshman Fall	Credits	Freshman Spring	Credits
ENGL 1105: First-Year Writing	3	ENGL 1106: First-Year Writing	3
Gen Ed: Quantitative and Computational Thinking:	3	AAEC 1005: Economic of the Food and Fiber System, *Or* ECON 2005: Principles of Economics	3
CSES 2444: Agronomic Crops	3	Gen Ed: Reasoning in the Natural Sciences: CHEM 1035: General Chemistry	3
BIOL 1105: Principles of Biology	3	BIOL 1106: Principles of Biology 1106	3
ENSC 1015: Foundations of Environmental Science	3	CHEM 1045: General Chemistry Lab	1
ALS 1234: CALS First Year Seminar	1		
Total	16	**Total**	13
Sophomore Fall	**Credits**	**Sophomore Spring**	**Credits**
AAEC 2434: Foundations of Agribusiness	3	HORT/BIOL 2304: Plant Biology	3
Gen Ed: Quantitative and Computational Thinking	3	Gen Ed: Critical Thinking in the Humanities	3
Gen Ed: Critical Thinking in the Humanities	3	Gen Ed: Reasoning in the Natural Sciences: CHEM 1036: General Chemistry	3
PPWS 2104: Plants, Genes, and People	3	CHEM 1046: General Chemistry Lab	1
CSES/ENSC 3114/GEOS 3614: Soils	3	Restricted Elective Course	3
CSES/ENSC 3124/GEOS 3624: Soils Laboratory	1	Free Elective Course	2
Total	16	**Total**	15
Junior Fall	**Credits**	**Junior Spring**	**Credits**
CSES 4214: Soil Fertility and Management	3	CSES 4144: Plant Breeding and Genetics	3
Gen Ed: Critique and Practice in Design and the Arts	3	ENT 4254: Insect Pest Management	3
Gen Ed: Discourse	3	Gen Ed: Critical Analysis of Identity and Equity in the United States	3
PPWS 4104: Plant Pathology	4	Restricted Elective Course	3
Restricted Elective Course	3	Free Elective Course	3
Total	16	**Total**	15
Senior Fall	**Credits**	**Senior Spring**	**Credits**
Gen Ed: Quantitative and Computational Thinking	3	SPES 4864: Plant Sciences Capstone	2

B.S. in Plant Science, Major: Plant Science

Freshman Fall	Credits	Freshman Spring	Credits
ENGL 1105: First-Year Writing	3	ENGL 1106: First-Year Writing	3
Gen Ed: Quantitative and Computational Thinking:	3	Gen Ed: Quantitative and Computational Thinking:	3
Gen Ed: Reasoning in the Natural Sciences: CHEM 1035: General Chemistry	3	Gen Ed: Reasoning in the Natural Sciences: CHEM 1036: General Chemistry	3
CHEM 1045: General Chemistry Lab	1	CHEM 1046: General Chemistry Lab	1
BIOL 1105: Principles of Biology	3	BIOL 1106: Principles of Biology	3
ALS 1234: CALS First Year Seminar	1	Free Elective Course	2
Total	**14**	**Total**	**15**
Sophomore Fall	**Credits**	**Sophomore Spring**	**Credits**
HORT/BIOL 2304: Plant Biology	3	AAEC 1005: Economic of the Food and Fiber System, *Or* ECON 2005: Principles of Economics	3
CSES 2444: Agronomic Crops, *Or* HORT 2224: Horticulture Science and Industry	2-3	Gen Ed: Critical Thinking in the Humanities	3
CHEM 2535: Organic Chemistry	3	CHEM 2536: Organic Chemistry	3
CHEM 2545: Organic Chemistry Lab	1	CHEM 2546: Organic Chemistry Lab	1
PPWS 2104: Plants, Genes, and People	3	Restrictive Elective Course	3
ENSC 1015: Foundations of Environmental Science	3	Free Elective Course	2-3
Total	**15 - 16**	**Total**	**15-16**
Junior Fall	**Credits**	**Junior Spring**	**Credits**
BCHM 3114: Biochemistry for Biotechnology and the Life Sciences, *Or* BCHM 4115: General Biochemistry	3 - 4	CSES 4144: Plant Breeding and Genetics	3
Gen Ed: Discourse	3	Gen Ed: Critical Thinking in the Humanities	3
Gen Ed: Quantitative and Computational Thinking:	3	Gen Ed: Critical Analysis of Identity and Equity in the United States	3
Gen Ed: Critique and Practice in Design and the Arts	3	Restricted Elective Course	3
Restricted Elective Course	3	CSES 4344: Crop Physiology and Ecology	3
Total	**15-16**	**Total**	**15**
Senior Fall	**Credits**	**Senior Spring**	**Credits**

Restricted Elective Course	3	SPES 4864: Plant Sciences Capstone	2
ALCE 3624: Communicating Agriculture and Life Sciences in Writing, *Or* ALCE 3634: Communicating Agriculture and Life Sciences in Speaking	3	Gen Ed: Reasoning in the Social Sciences	3
PPWS 4104: Plant Pathology	4	Restricted Elective Course	3
Free Elective Course	3	Free Elective Course	3
Free Elective Course	2-3	Gen Ed: Critique and Practice in Design and the Arts	3
Total	**15-16**	**Total**	**14**

B.S. in Plant Science, Major: Environmental Horticulture

Freshman Fall	Credits	Freshman Spring	Credits
ENGL 1105: First-Year Writing	3	ENGL 1106: First-Year Writing	3
Gen Ed: Quantitative and Computational Thinking:	3	Gen Ed: Quantitative and Computational Thinking	3
HORT 2224: Horticulture Science and Industry	2	BIOL 1106: Principles of Biology	3
BIOL 1105: Principles of Biology	3	Gen Ed: Critique and Practice in Design and the Arts	3
Gen Ed: Critical Thinking in the Humanities	3	HORT 2234: Environmental Factors in Horticulture	3
ALS 1234: CALS First Year Seminar	1		
Total	**15**	**Total**	**15**
Sophomore Fall	**Credits**	**Sophomore Spring**	**Credits**
AAEC 1005: Economic of the Food and Fiber System, *Or* ECON 2005: Principles of Economics	3	AAEC 2434: Foundations of Agribusiness	3
ENSC 1015: Foundations of Environmental Science	3	Gen Ed: Critical Thinking in the Humanities	3
Gen Ed: Discourse	3	Gen Ed: Reasoning in the Natural Sciences:	3
PPWS 2104: Plants, Genes, and People	3	HORT/BIOL 2304: Plant Biology	3
Gen Ed: Reasoning in the Natural Sciences	3	Gen Ed: Quantitative and Computational Thinking	3
Total	**15**	**Total**	**15**
Junior Fall	**Credits**	**Junior Spring**	**Credits**
HORT 3324: Herbaceous Landscape Plants	3	HORT 3325: Woody Landscape Plants, *Or* HORT 3326: Woody Landscape Plants	3
HORT 2244: Plant Propagation	3	Restricted Elective Course	3
Gen Ed: Critique and Practice in Design and the Arts	3	Gen Ed: Reasoning in the Social Sciences	3
PPWS 4104: Plant Pathology	4	CSES/ENSC 3134: Soils in the Landscape	3
Restricted Elective Course	3	Restricted Elective Course	3
Total	**16**	**Total**	**15**
Senior Fall	**Credits**	**Senior Spring**	**Credits**
HORT 4324: Greenhouse Management	3	SPES 4864: Plant Sciences Capstone	2
AAEC/MGT 3454: Small Business Management and Entrepreneurship	3	ENT 4254: Insect Pest Management	3

ALCE 3624: Communicating Agriculture and Life Sciences in Writing, *Or* ALCE 3634: Communicating Agriculture and Life Sciences in Speaking	3	Restricted Elective Course	3
Restricted Elective Course	3	Gen Ed: Critical Analysis of Identity and Equity in the United States	3
Free Elective Course	3	Free Elective Course	3
Total	**15**	**Total**	**14**

Appendix B
Course Descriptions

General Education Required Courses

AAEC 1005: Economics of the Food and Fiber System (3 credits)
How the individual economic actor makes rational choices as: consumer, producer, firm/farm, saver, investor, employee, employer, manager, trader. Economic principles that underlie exchange in business, government and household transactions. Utility maximization in the U.S. and global food and fiber system under conditions of scarcity. Evaluation of policy issues important to society.

ECON 2005: Principles of Economics (3 credits)
Introduction to microeconomics. The economic approach to decision-making. Model of supply and demand. Elasticities. Consumer behavior. Firm behavior under varying industry structures. Sources and consequences of market failure. Costs and benefits of international trade. The role of government in the economy. Economic, ethical, and social ramifications of issues such as pollution, missing information, and income inequality.

ENGL 1105: First-Year Writing (3 credits)
Introduction to rhetorical analysis, visual rhetoric, critical writing, and critical thinking; intensive reading of works in multiple genres; practice in writing and revision; fundamentals of oral presentations.

ENGL 1106: First-Year Writing (3 credits)
Continued study in rhetorical analysis and the conventions of various genres; intensive instruction in writing and revision of work that incorporates research; experience in oral presentations.

Core Courses

ALCE 3624: Communicating Agriculture and Life Sciences in Writing (3 credits)
Development of communication skills necessary to deal with the general public and audiences in the food, agriculture, and natural resources fields. Emphasis on writing and on creation of a portfolio including multiple types of written communication.

ALCE 3634: Communicating Agriculture and Life Sciences in Speaking (3 credits)
Development of strategies and techniques for effective oral communication in the professions related to food, agriculture, and natural resources. Emphasis on oral, visual, and interpersonal communication, as well as group leadership and meeting management.

ALS 1234: CALS First Year Seminar (1 credit)
Exploration of topics related to the College of Agriculture and Life Sciences (CALS) from a multidisciplinary perspective with a focus on communication and teamwork, problem-solving,

Table of Contents

Virginia Polytechnic Institute and State University

Proposed Intent to Discontinue

Virginia Polytechnic Institute and State University (Virginia Tech) requests to discontinue the Bachelor of Science (B.S.) in Horticulture degree program (01.1103). The degree program is located in the School of Plant and Environmental Sciences in the College of Agriculture and Life Sciences.

Background

The Bachelor of Science in Horticulture degree program has been offered since 1872. The degree program was originally housed in the Department of Horticulture, Mycology, and Entomology. In 1902, the Department of Horticulture was officially formed and has served as the home for the degree program in the College of Agriculture and Life Sciences until July of 2018. At that time, the departments of Horticulture, Crop and Soil Environmental Sciences, and Plant Pathology, Physiology, and Weed Science were merged to form the School of Plant and Environmental Sciences in the College of Agriculture and Life Sciences.

During the spring and summer of 2015, the faculty members convened and discussed options for undergraduate degree programming that would best meet the needs of the students and leverage the collaborative opportunities offered by the planned School of Plant and Environmental Sciences. As a result, the faculty recommended the merger of two degree programs, the Bachelor of Science (B.S.) in Horticulture and the Bachelor of Science (B.S.) in Crop and Soil Environmental Sciences, into one Bachelor of Science (B.S.) in Plant Science degree program. The merged program was determined to best serve the students by providing a unified curriculum with a wider breadth of foundational subject material and more depth within the specialization areas (i.e., majors).

Based on the faculty recommendations, school leadership endorsed the merged B.S. in Plant Science degree program and the discontinuation of the B.S. in Horticulture degree program. With support of the Dean of the College of Agriculture and Life Sciences, the college Curriculum Committee voted to discontinue the degree program on August 15, 2016 once the newly merged Bachelor of Science (B.S.) in Plant Science degree program was approved.

Rationale

The B.S. in Horticulture degree will be merged into the proposed B.S. in Plant Science degree program. In order to be merged into the proposed new degree program, the B.S. in Horticulture degree program must be discontinued.

Critical Shortage Area

The B.S. in Horticulture is not a critical shortage area. The curriculum will be offered as a sub-area in the merged B.S. in Plant Science degree program.

Teach-out Plan

A total of 83 students are currently enrolled in the B.S. in Horticulture. In addition, the program plans to enroll 10 new students in the fall of 2021. Twenty-eight (28) students are expected to graduate in 2021, 24 students are expected to graduate in 2022, 15 students are expected to graduate in 2023, 16 students are expected to graduate in 2024, and 10 students are expected to graduate in 2025.

The last term that students will be able to complete the B.S. in Horticulture degree is Spring of 2026. This will allow for 5 full years to complete the degree.

To ensure that students with challenges can meet the deadline, the discontinuation of the degree program has been extended beyond the expected date for all students to graduate. The degree program will be discontinued after the Spring 2026 graduation. Students will no longer be accepted into the Horticulture degree program, including internal major changes and second majors, after the spring timeframe for changing majors has passed (January 2022) to ensure students can meet the deadline.

"Stopped Out" Students

The 3 students that have "stopped out" since 2014 have been considered. There is a 6-year period in which students may return and complete the Bachelor of Science in in Horticulture degree program. This group of students will be notified in writing about the discontinuation of the degree program. Additionally, any student that cannot complete the degree program by Spring 2026 will have the option to complete a B.S. in Plant Science through the School of Plant and Environmental Sciences or another viable degree program on campus. The School of Plant and Environmental Sciences undergraduate program advisors will assist students through the transition process.

The existing Horticulture courses will continue to be offered through the School of Plant Science and will be offered as a major within the proposed merged B.S. in Plant Science degree program. Any student that chooses to complete a B.S. in Plant Science degree through the School of Plant and Environmental Sciences, may choose to use their Horticulture courses toward a Plant Sciences degree or major.

Table of Contents

Virginia Polytechnic Institute and State University

Proposed Intent to Discontinue

Virginia Polytechnic Institute and State University (Virginia Tech) requests to discontinue the Bachelor of Science (B.S.) in Crop and Soil Environmental Sciences degree program (01.1102). The degree program is located in the School of Plant and Environmental Sciences in the College of Agriculture and Life Sciences.

Background

The Department of Crop and Soil Environmental Sciences was formed in 1908 under the name of the Department of Agronomy. The name was changed to the Department of Crop and Soil Environmental Sciences in 1987 and has served as the home for the degree program in the College of Agriculture and Life Sciences until July of 2018. At that time, the departments of Horticulture, Crop and Soil Environmental Sciences, and Plant Pathology, Physiology, and Weed Science were merged to form the School of Plant and Environmental Sciences in the College of Agriculture and Life Sciences.

During the spring and summer of 2015, the faculty members convened and discussed options for undergraduate degree programming that would best meet the needs of the students and leverage the collaborative opportunities offered by the planned School of Plant and Environmental Sciences. As a result, the faculty recommended the merger of two degree programs, the Bachelor of Science (B.S.) in Horticulture and the Bachelor of Science (B.S.) in Crop and Soil Environmental Sciences, into one Bachelor of Science (B.S.) in Plant Science degree program. The merged program was determined to best serve the students by providing a unified curriculum with a wider breadth of foundational subject material and more depth within the specialization areas (i.e., majors).

Based on the faculty recommendations, school leadership endorsed the merged B.S. in Plant Science degree program and the discontinuation of the B.S. in Crop and Soil Environmental Sciences degree program. With support of the Dean of the College of Agriculture and Life Sciences, the college Curriculum Committee voted to discontinue the degree program on August 15, 2016 once the newly merged Bachelor of Science (B.S.) in Plant Science degree program was approved.

Rationale

The B.S. in Crop and Soil Environmental Sciences degree will be merged into the proposed B.S. in Plant Science degree program. In order to be merged into the proposed new degree program, the B.S. in Crop and Soil Environmental Sciences degree program must be discontinued.

Critical Shortage Area

The B.S. in Crop and Soil Environmental Sciences is not a critical shortage area. The curriculum will be offered as a sub-area in the merged B.S. in Plant Science degree program.

Teach-out Plan

A total of 56 students are currently enrolled in the B.S. in Crop and Soil Environmental Sciences degree program. In addition, the program plans to enroll 10 new students in the fall of 2021. Twenty-five (25) students are expected to graduate in 2021, 15 students are expected to graduate in 2022, 7 students are expected to graduate in 2023, 9 students are expected to graduate in 2024, and 10 students are expected to graduate in 2025.

The last term that students will be able to complete the B.S. in Crop and Soil Environmental Sciences degree program is Spring of 2026. This will allow for 5 full years to complete the degree program.

To ensure that students with challenges can meet the deadline, the discontinuation of the degree program has been extended beyond the expected date for all students to graduate. The degree program will be discontinued after the Spring 2026 graduation. Students will no longer be accepted into the Crop and Soil Environmental Sciences degree program, including internal major changes and second majors, after the spring timeframe for changing majors has passed (January 2022) to ensure students can meet the deadline.

"Stopped Out" Students

The 3 students that have "stopped out" since 2014 have been considered. There is a 6-year period in which students may return and complete the Bachelor of Science in Crop and Soil Sciences degree program. This group of students will be notified in writing about the discontinuation of the degree program. Additionally, a student that cannot complete the degree programs by Spring 2026 will have the option to complete a B.S. in Plant Science through the School of Plant and Environment Sciences or another viable degree program on campus. The School of Plant and Environmental Sciences Undergraduate Program advisors will assist students through the transition process.

The Crop and Soil Environmental Sciences core classes will continue to be offered through the School of Plant and Environmental Sciences. Any student that chooses to complete a B.S. in Plant Science degree through the School of Plant and Environmental Sciences, may choose to use their Crop and Soil Sciences courses toward a Plant Sciences degree or major.