THE UNIVERSITY OF ARIZONA

UNDERGRADUATE EMPHASIS (SUB-PLAN) REQUEST FORM
MAJORS WITH EXISTING EMPHASES (SUB-PLANS)

Requests for the creation of a new emphasis requires approval from the school director/department head (managing administrator), college academic dean, Curricular Affairs, Undergraduate Council (UGC), and College Academic Administrators Council (CAAC). Complete this form (for each proposed emphasis) and submit to Martin Marquez (martinmarquez@email.arizona.edu), no later than October 25, 2019 to be considered for inclusion in the 2020-2021 Academic Catalog.

I. **Requested by (College & School/Department):** College of Agriculture and Life Sciences/School of Plant Sciences, Department of Biosystems Engineering, Department of Environmental Science

II. **Proposer's name, title, email and phone number:**
Dr. Kitt Farrell-Poe, Head of Biosystems Engineering Department, kittfp@email.arizona.edu, 626-9120
Dr. Jon Chorover, Head of Environmental Science Department, chorover@email.arizona.edu, 621-7228
Dr. Matt Jenks, Director of the School of Plant Sciences, jenksm@email.arizona.edu, 621-1977

III. **Degree, major and number of students currently enrolled in the major (include dual majors):**
BS, Sustainable Plant Systems. 58 current major

IV. **Total number of students that have completed the major in the past 3 years: 40**

V. Complete the table below capturing information about your existing major emphases. Add columns as needed.

Note that the values in this table are based on approval of co-submitted requests for curricular changes.

Name of existing emphasis plan(s)	Agronomy	Fresh Produce Safety	Controlled Environment Agriculture	Environmental Horticulture	Turf (discontinued)	No subplan selected
First term emphasis was offered	Fall 2012	Fall 2012	Fall 2012	Fall 2012		
Minimum units required to complete major core and emphasis (total)	87	87	87	87		
Minimum upper division (300 level or above) units required to complete major core and emphasis (total)	57	57	47	44		
Additional requirements to complete emphasis (supporting coursework*, lecture series, GPA, non-credit workshop)	None	None	None	None		
Number of students enrolled in emphasis	12	10	17	5	0	8
Total number of students that have completed emphasis in past 3 years	8	7	13	11	1	NA

*- courses that do not count towards major units and major GPA, but are required for the major

VI. Name of the proposed emphasis: Urban Horticulture

VII. Campus and location offering-indicate the campus(es) and location(s) where this emphasis will be offered.

☒ Main | ☐ UA Online | ☐ Phoenix Biomedical | ☐ Distance (type in location(s) below):

VIII. Provide a rationale for the proposed new emphasis. Survey your current majors to provide evidence of student interest in/demand for the proposed emphasis – attach the survey questions and results at the end of this proposal. Write a short summary of the findings of the survey. Ensure your survey seeks evidence of how the new emphasis will impact existing emphases. You may also include external data (Bureau of Labor Statistics, reports/letters of support from relevant bodies, etc.). Curricular Affairs can provide a job posting/ demand report

by skills obtained/outcomes of the proposed emphasis. Please contact Martin Marquez to request the report for your proposal.

An *Urban Horticulture* emphasis area that will replace the current *Environmental Horticulture* emphasis area is being proposed to meet needs expressed to advisors by current and former students, and to address a sector of horticulture with emerging importance in light of climate change and the consequential need for more sustainable landscape practices. The subplan will expand focus to include content most relevant for urban plant selection, landscape management, utilization, as well as urban horticultural production systems. The focus of this emphasis area will be on the use of plants and soil resources in residential and urban settings, in contrast to the current emphasis area in *Environmental Horticulture* that concentrates mainly on production horticulture (primarily vegetable production).

In the US, horticulture is facing a crisis as older plant growers, nursery managers and groundskeepers reach retirement age, there are too few replacements trained to replace them. Given the increasing urbanization of the world's growing population, urban horticulture is essential to maintaining the connection between people and the planet that sustains us. Everyone needs plants. They are foundational in supporting human and environmental health providing food, fiber, fuel, medicine, oxygen and beauty, to name a few. Despite our reliance, most Americans are not able to identify more than a handful of species growing around them. This indifference is one of the woes facing the green industry.

Urban Horticulture is a broad area within the green industry, encompassing urban and suburban residential and commercial landscapes and public spaces, both indoor and outdoor plant production, and covering plant materials ranging from vines, and grasses, to trees and shrubs. The *Urban Horticulture* emphasis area offers diverse courses addressing principles of sustainability applied in landscape design, breeding, maintenance, and inclusive of the management of urban public and community gardens and greenhouses.

Students majoring in Sustainable Plant Systems were polled to gauge interest in Urban Horticulture as an emphasis area. Eighty-five percent of the respondents expressed medium to high interest in Urban Horticulture. When asked to rank interest in the Sustainable Plant Systems areas of emphasis, Urban Horticulture was the second most selected area. Furthermore, 60% indicated that they expect to reside in urban or suburban areas. Employment opportunities in these locales are more likely to require skills afforded by instruction in Urban Horticulture than an emphasis in Agronomy or Fresh Produce Safety.

The *Urban Horticulture* emphasis area will add considerable breadth to the degree with a goal of expanding opportunities for students in our current degree program who are seeking careers in the green industry, in new and emerging areas in urban horticulture. The subplan also supplements instructional needs of students studying in the Sustainable Built Environments degree (CAPLA) with related interest in urban sustainability and landscape architecture.

A new course, PLS 303 *Arboriculture*, has been developed for this focal area. PLS 235 *Introduction to Horticulture* is also required. The *Urban Horticulture* emphasis area draws on expertise in the School of Landscape Architecture and Planning, requiring LAR 420 *Plant Materials*, and offering LAR 350 *Parks and Urban Public Spaces* and LAR 423 *Landscape Ecology* as selectives. The list of selectives is extensive to provide students maximum flexibility to tailor the program to their needs.

IX. At minimum, provide two unique learning outcomes for the proposed emphasis. Which courses in the emphasis will Introduce, Practice, and/or Assess the learning outcomes? Use the table below to provide the information. Add rows as needed.

Learning Outcome	Introduced	Practiced	Assessed

Students will be able to recognize, and name, a diverse range of horticultural plants used in southwest landscapes and gardens.	PLS235 Introduction to Horticulture	LAR420 Plant Materials	PLS498 Senior Capstone
Students will be able to understand and apply biological principles and horticultural techniques to develop sustainable landscape maintenance systems.	PLS235 Introduction to Horticulture	PLS303 Arboriculture	PLS498 Senior Capstone

X. Requirements to meet 40% commonality across emphases. ABOR Policy 2-221-c. Academic Degree Programs Subspecializations requires all undergraduate emphases within a major to share at least 40% curricular commonality across emphases (known as "major core"-courses counting towards major units and major GPA). List the required major core curriculum required of all emphases. Refer to your existing advisement report(s), if needed. Include the prefix, course number, course title and number of units. Add rows as needed.

Requirement Title/Description	Courses (include prefix, number, title, units)	Minimum units needed to satisfy requirement
Supporting Coursework	1. First Semester General Chemistry (4) CHEM 141, CHEM 143, CHEM 151, CHEM 161, CHEM 163 2. Second Semester General Chemistry (4) CHEM 142, CHEM 144, CHEM 152, CHEM 162, CHEM 164 3. Advanced Chemistry, complete 3 units of the following CHEM 241A (3) Lectures in Organic Chemistry CHEM 242A (3) Honors Lectures in Organic Chemistry CHEM 246A (3) Lectures in Organic Chemistry ENVS 462 (3) Environmental and Soil Chemistry 4. Calculus I (3) MATH 122B, MATH 125 5. Statistics (3) ENVS 275, MATH 263, DATA/MATH 363, AREC 239 6. Intro Physics I PHYS 102 (3) Introductory Physics I	20
Major Core	1. ENVS 200 (3) Introduction to Soil Science 2. ENVS 201 (1) Soils Laboratory 3. ENVS 316 (3) Soil Fertility and Plant Nutrition 4. PLS 240 (4) Plant Biology 5. Genetics, complete 4 units from the following: PLS/ACBS 312 (4) Animal and Plant Genetics ECOL 320 (4) Genetics ECOL 320H (5) Genetics 6. Plant Propagation, complete 3 units from the following: PLS 330 (3) Principles and Techniques of Plant Propagation and Culture PLS 397A (3) Yuma Production Systems	40

	7. Insect Pest Management, complete 3 units from the following: ENTO/AGTM/BE 497C (3) Greenhouse Pest Management: Methods and Practice ENTO 468 (3) Integrated Pest Management ENTO 300 (3) Insect Pest Management for Desert Cropping Systems 8. Plant Pathology PLP/MIC 305 (3) Introductory Plant Pathology 9. Applied Plant Physiology, complete 3 units from the following: PLS/BE 475A (3) Applied Plant Physiology PLS 360 (3) Plant Growth and Physiology 10. Soil Management, complete 3 units from the following: ENVS 300 (3) Soil Ecology of Sustainable Systems ASM/ENVS 404 (3) Irrigation Principles and Management 11. Colloquia, complete 1 unit from the following: PLS 195A (1) How Will We Feed and Clothe 9-billion People in 2050? ASM 195A (1) Introduction to Agricultural Systems Management 12. Communications, complete 3 units from the following: ENVS 408 (3) Scientific Writing for Environmental, Agricultural and Life Sciences ENVS 415 (3) Translating Environmental Science ALC 422 (3) Communicating Knowledge in Agriculture and the Life Sciences 13. Career Preparation (3 units) Maximum of 2 units of PLS 498 may count towards this requirement: (NEW) PLS 195C (1) Sustainable Plant Systems Colloquium PLS 498 (1-3) Senior Capstone ASM 499 (1-5) Independent Study 14. Internship/Applied Course, complete 3 units from the following: ASM/ENVS/PLS/BE 392, 393, 399, 492, 493, 498H, or 499	
	Total major core upper division units required	30
	Total major core units required	40

XI. Requirements specific to the proposed emphasis. List the required emphasis core, electives, and any special conditions students must meet to complete the emphasis using the table below. Include the prefix, course number, course title, and units for each course. Provide email(s)/letter(s) of support from home department head(s) for courses not owned by your department. Highlight and label (NEW) any new courses that must be developed for the emphasis. Add rows as needed.

Note: a proposed emphasis having similar curriculum with other plans (within department, college, or university) may require completion of a comparison chart. Total units required for each emphasis must be equal.

Requirement Title/Description	Courses (include prefix, number, title, units)	Minimum units needed to satisfy requirement
Emphasis Core	1. LAR 420 (4) Plant Materials 2. PLS 235 (3) Introductory Horticulture 3. (New) PLS 303 (2) Arboriculture	9
Emphasis Electives	1. Complete 18 units from the following: ACBS 411 (3) Agriculture, Environmental and Legal Issues ACBS 437 (3) Food Safety Laws and Legal Policies ACBS 456 (3) Aquaculture AGTM 200 (3) Solar Photovoltaic Energy Systems with Applications to Agriculture AGTM 330 (3) Turf and Landscape Technology BE 217 (3) Introduction to Hydroponics BE 217L (1) Lab: Introduction to Hydroponics BE 221 (3) Introduction to Computer Aided Design BE 334 (3) Aquaponics Design BE 350 (3) Advanced Hydroponic Crop Production BE 350L (1) Advanced Hydroponic Crop Production Laboratory BE 456 (3) Irrigation Systems Design BE 479 (3) Applied Instrumentation for Controlled Environment Agriculture BE 483 (3) Controlled Environment Systems BIOC 384 (3) Foundations in Biochemistry ECOL 414 (2) Plants of the Desert ENTO 310 (3) Living in Symbiosis ENTO 436 (3) Agro-ecology ENVS 401 (3) Sustainable Management of Arid Lands & Salt-Affected Soils ENVS 450 (3) Green Infrastructure ENVS 454 (3) Water Harvesting LAR 350 (3) Parks and Urban Public Spaces LAR 423 (3) Landscape Ecology PLG 408 (3) Planning for Urban Resilience PLP 427R (3) General Mycology PLS 300 (3) Applied Weed Science PLS 306 (3) Crop Science and Production PLS 333 (3) General Virology PLS 340 (3) Introduction to Biotechnology PLS 359 (3) Plant Cell Structure and Function PLS 360 (3) Plant Growth and Physiology PLS 330 (3) Arboriculture PLS 415 (3) Plant Breeding and Genetics PLS 424L (2) Plant Biotechnology Laboratory	18

	PLS 424R (3) Plant Biotechnology PLS 449A (3) Plant Genetics and Genomics PLS 456 (3) Topics in Biotechnology PLS 480 (3) Medicinal Plants PLS 497F (2 – 6) Community and School Garden Workshop RNR 310 (2) Agave, Cacti, and Other Succulents of Southern Arizona RNR 400 (3) Noxious, Invasive Plants of Arizona RNR 403 (3) Applications of Geographic Information Systems RNR 417 (3) Geographic Information Systems for Natural and Social Sciences SBE 201 (3) Sustainable Design and Planning	
	Total emphasis upper division units required	11
	Total major emphasis units required*	27

*** All emphases offered for this major must have the same minimum number of units required**

XII. Emphasis course/faculty information for existing courses. Complete the table below for all emphasis coursework. You can find information to complete the table using the UA course catalog or UAnalytics (Catalog and Schedule Dashboard> "Printable Course Descriptions by Department" On Demand Report; right side of screen). Provide email(s)/letter(s) of support from home department head(s) for courses not owned by your department. Add rows as needed.

Course prefix and number	Title	Course Description	Typically Offered (F, Sp, Su, W) and Frequency (every year, odd years, etc.)	Home Department	Faculty members available to teach the courses
LAR 420	Plant Materials	This course focuses on the examination and evaluation of plants effectively used in landscapes of the Southwest. Emphasis is placed on strategies useful for plant identification and appropriate plant selection for a variety of landscape uses. Field studies will be the primary mode of instruction whereas classroom lectures provide support material for the field work.	fall	Landscape Arch & Plan	Margaret Livingston
PLS 235	Introduction to Horticulture	Basic principles of cultural requirements, production systems, marketing and uses of herbaceous and woody ornamental plants.	spring	PLS	Tanya Quist
ACBS 411	Agriculture, Environmental and Legal Issues	Students will be introduced to fundamental concepts associated with modern day agricultural industries to help them understand legal concepts as well as public policy that affects the commodities markets, natural resources in their "raw form", consumer attitudes, and market forces that affect various agribusiness industries of the west. Students will receive exposure to the framework of the United States legal system, with a brief review of the three distinct branches of government and how each branch impacts the development of law and policy as related to the production agriculture. The majority of the course will focus on four (4) primary areas: 1.) Animal welfare, law and policy, 2) Food safety regulations and organic growing standards in production agriculture and organic livestock standards, 3.) An overview of Environmental law, policy and 4.) Water law and policy. Students will be able to demonstrate how science, law and policy impact the modern day agriculturist as well as natural resource users.	spring	ACBS	Joe Willis
ACBS 437	Food Safety Laws and Legal Policies	The class is recommended for Junior and Senior year students. Students will learn about food safety policy, including the laws and associated implementing regulations, and how they are developed by Congress and enforced by the primary Federal public health agencies. Although specific focus will be on food safety, related consumer protection policies will be addressed,	fall	ACBS	Daniel Engeljohn

		including food labeling and the humane handling of animals prior to slaughter. Students will assess scenarios involving how the Administrative Procedure Act guides Federal food safety policy development in order to withstand legal challenge from stakeholders, including consumers, the food industry, and foreign governments. Scenarios also will be assessed on how exported and imported food policy is established and enforced in order to comply with international treaties and trade policies. Students will learn how to find resources on how to comply with food safety policy. Students will be able to use this knowledge to bridge the gap between stakeholders and facilitate development of compliant food products that expand both domestic and global trade.			
ACBS 456	Aquaculture	Overview lectures and assigned readings on the theory and practice of aquaculture. Includes the culture of seaweeds, mollusks, crustaceans, and finfish.	spring	ACBS	Arun Dhar
AGTM 200	Solar Photovoltaic Energy Systems with Applications to Agriculture	Solar Photovoltaic Energy Systems provides an overview of solar energy system technology with applications to agriculture. Students will be exposed to multiple types of solar photovoltaic energy systems and system components. Students will use solar tools and materials to assemble and operate systems, measure energy output, calculate system capacity, and assess variables effecting system performance.	summer	Ag Ed	Edward Franklin
AGTM 330	Turf and Landscape Technology	The basic scientific principles and skills of construction, operation, and maintenance in turf, landscape and urban agricultural equipment. Provides student with laboratory experiences in machinery, sprinkler and drip irrigation installation, operation and maintenance, chemical application systems, and hardscaping.	spring, odd yrs	Ag Ed	Edward Franklin
BE 217	Introduction to Hydroponics	Introduction to hydroponics and hydroponic systems for various crops: an historical perspective and current trends; basic plant physiology and anatomy; general cultural practices; plant protection (insects and diseases); traditional and organic hydroponic production systems; pollination, fertilization and bee management; plant nutrition and disorders; irrigation systems and nutrients; transplant production; greenhouse site selection, structures and control systems; fruit harvest; food handling and safety; marketing and economics of a hydroponic business.	fall	BE	Stacy Tollefson
BE 217L	Lab: Introduction to Hydroponics	This is a hands-on course, teaching hydroponic tomato production from seedling through harvest using commercial style high-wire production techniques. Students apply what they have learned in BE 217R Lecture to real plants in a greenhouse setting. Course covers plant cultivation techniques such as clipping, stem	fall	BE	Stacy Tollefson

		pruning, leaning and lowering, cluster pruning and clipping, leaf maintenance, and harvesting techniques. Course also includes gaining skills in plant spacing, making nutrient tanks, monitoring plant health, pollination, and irrigation and climate control factors important for a successful crop. Observations of other hydroponic production systems in use at the UA-CEAC facility are also included.			
BE 221	Introduction to Computer Aided Design	Introduction to computer aided design concepts and techniques. Two and three-dimensional drawing presentation, methods of graphical communications, data analysis, design synthesis and production methods.	fall, winter, spring, summer	BE	Muluneh Yitayew
BE 334	Aquaponics Design	This course begins with an introduction into the field of aquaponics -- the culture of fish and plants together and then provides an in depth guide into designing and building aquaponics systems. Various types of aquaponics systems and their parts will be discussed in addition to learning about water pressure and flow in aquaponics systems. The course provides students with hands-on learning activities and offers students the opportunity to engage in an online, group project.	summer	BE	Matthew Recsetar
BE 456	Irrigation Systems Design	Design and operation of surface, sprinkler, and trickle irrigation systems based on economic and environmental criteria.	spring, odd yrs	BE	Akrum Tamimi
BE 479	Applied Instrumentation for Controlled Environment Agriculture	Students will learn principles, methods, and techniques related to the measurement and control of environmental factors affecting plant growth and plants' surrounding climate under controlled environments. Light intensity, light quality, temperature (air, plant), relative humidity, carbon dioxide, water, air current, and related factors are important variables in controlled environment plant production systems to measure and control since they affect and determine plant growth and development and processes such as heating, ventilating and air conditioning, fertigation etc. Therefore, students will learn application of sensors, instrumentation and designing of a simple system to measure and control environments for plant production systems.	spring	BE	Murat Kacira
BE 483	Controlled Environment Systems	An introduction to the technical aspects of greenhouse design, environmental control, hydroponic crop production, plant nutrient delivery systems, intensive field production systems, and post-harvest handling and storage of crops.	fall	BE	Gene Giacomelli
BIOC 384	Foundations in Biochemistry	Structure and function of proteins, lipids, carbohydrates, and nucleic acids, with a focus on understanding the molecular function of essential biomolecules.	fall, winter, spring, summer	BIOC	multiple instructors

ECOL 414	Plants of the Desert	Designed for teachers and others wishing to become familiar with common native and cultivated plants; identification, ecology, and uses.	summer	EEB	James Malusa
ENTO 310	Living in Symbiosis	This course will provide an overview of the diversity of associations that exist between microbes and eukaryotic hosts. The course will span from highly integrated obligatory symbioses to loose associations. Emphasis will be placed on symbiotic associations with relevance to human medicine, veterinary sciences, and agriculture.	fall	ENTO	S Stock
ENTO 436	Agro-ecology	Agro-ecology is the application of ecological principles to the production of food and fiber. The underlying goals are to assess and promote the long-term sustainability of agricultural production systems. Through this course we will study how agro-ecosystems vary across time and space and will examine the trade-offs associated with different cropping systems and management practices. We will begin with a brief history of major trends in agriculture, then examine the ecological interactions involved in crop production, observe how these interactions shape agricultural practices and conclude with a discussion of domestic and international government policies that influence agricultural sustainability.	spring	ENTO	Kathleen Walker, Yves Carriere
ENVS 401	Sustainable Management of Arid Lands & Salt-Affected Soils	Principles and practices of soil, water and crop management under arid and semiarid conditions; the use of diagnostic procedures for evaluating soils and waters, reclamation, and economics of irrigation project development.	fall	ENVS	James Walworth
ENVS 450	Green Infrastructure	The goal of this course is the advancement of students' knowledge and capabilities regarding Green Infrastructure concepts and the issues and techniques involved in implementation of Green Infrastructure. The course provides an overview as well as more in-depth coverage of the science, practical context, and creation of Green Infrastructure. The built environment of arid regions is emphasized, with Tucson Case Studies providing practical focus to content and learning objectives. The term Green Infrastructure, as used in this course, aligns with the following EPA description: "Green infrastructure uses vegetation, soils, and natural processes to manage water and create healthier urban environments... at the scale of a neighborhood or site, green infrastructure refers to stormwater management systems that mimic nature by soaking up and storing water." The course features lectures, interactive discussions and presentations, and guest presentations and tours led by experts in their fields. Students take a series of quizzes, a	fall	ENVS	Bailie Mccormick

		mid-term and a final exam, along with a number of homework assignments / exercises. A special research report is required of Graduate Students.			
ENVS 454	Water Harvesting	Course focuses on water harvesting principles and techniques at a variety of scales and settings. Students participate in hands-on implementation of water harvesting projects on the UA campus.	spring	ENVS	Bailie Mccormick
GEOG 497F	Community and School Garden Workshop	This workshop-based course is designed to enable UA undergraduates and graduates students to work in Tucson-area schools helping students and teachers to undertake the design, construction, planting, harvesting and preparation of foods from a local school garden. The workshop also involves preparing or assembling curriculum materials to enable teachers and students to teach and learn about food production, food histories and geographies, and food politics. The course includes an intensive workshop sponsored by the Tucson Community Food Bank. In addition to attending that workshop, students are also expected to attend at least one fieldtrip among the two that are organized during the semester as well as attend monthly meetings of the group on the UA campus. Most of the workshop, however, revolves around consistent and engaged involvement with a Tucson school and its teachers and students supporting the development and maintenance of school garden and attendant curriculum.	fall, spring	GEOG	Moses Thompson, Sallie Marston
LAR 350	Parks and Urban Public Spaces	This course exams the history, function, politics and design of parks, gardens and other urban public spaces in American cities. A typology of public space will be presented and used to examine public life today and how design and public involvement influence the nature of public space. The course will examine contemporary issues in parks and public space such as place-making, environmental integrity and sustainability, diversity and accessibility issues, children and nature, and the privatization of public space.	fall, spring, summer	Landscape Arch & Plan	Gina Chorover
LAR 423	Landscape Ecology	The emphasis of this course is the understanding and subsequent use of principles of landscape ecology. This will be accomplished through the study of how spatial heterogeneity in landscapes influences various ecological processes in natural and created landscapes. Lectures will primarily focus on an abbreviated review of ecosystem processes, characterization of landscape pattern and dynamics, and the consequences of these factors on the environments we examine in the profession of landscape architecture. Material will typically be presented with a more	spring	Landscape Arch & Plan	Margaret Livingston

		global perspective, whereas class discussions and field trips will generally focus on regional examples. Topics and concepts related to landscape ecology such as creating sustainability in environments and rehabilitation of terrestrial plant communities will also be highlighted in the course.			
PLG 408	Planning for Urban Resilience	Cities are on the frontlines of climate change as the built environment is impacted by increasing sea level rise, floods, drought, wildfires and urban heat. This course explores the challenges and opportunities of planning and designing the built environment for climate adaptation and resilience. Urban resilience is the capacity of cities and their interconnected systems to survive, adapt, and thrive no matter what chronic stresses and acute shocks they experience. Students will learn a range of climate impacts on the built environment, examine different planning and design strategies to increase urban resilience, and explore real world case studies of cities planning for urban resilience. Urban resilience will be considered through a variety of planning and design scales - buildings, landscapes, neighborhoods, cities, and regions. This course emphasizes inclusive planning processes that engage the most vulnerable populations to climate impacts. Guest lectures from researchers and practitioners will also be featured to share their professional experiences in connecting climate science to planning and design efforts.	spring	PLG	Millard Keith
PLP 427R	General Mycology	An exploration of the diversity of fungi and fungus like organisms covering general biology and roles as pathogens (of humans and plants), saprobes and symbionts. Fungi as models for eukaryotic molecular research and their uses in industry will be covered.	fall	PLP	Marc Orbach
PLS 300	Applied Weed Science	This course will cover applied aspects of weed management in the low deserts of Arizona. The focus will be on chemical and non-chemical techniques used in the production of field and vegetable crops. Weed identification and classification will be covered. Non-chemical weed management will include cultural, mechanical and biological control methods. Chemical control will include herbicide mode of action, adjuvants, resistance and soil persistence. Field projects will be conducted.	spring, even yrs	PLS	Barry Tickes
PLS 306	Crop Science and Production	An examination of the fundamental aspects of plant science as applied to crop production. Laboratory exercises will be field-oriented and will involve several field trips.	fall, even yrs	PLS	Samuel Discua Duarte
PLS 333	General Virology	This course will be offered every other year in the fall semester. The course will provide a general introduction to the field of Virology, inclusive of bacterial, animal, and plant viruses. Topics will include the history of virology, taxonomy and classification of	spring, even yrs	PLS	Judith Brown

		viruses, introduction to virus structure and assembly, types of virus genomes and functions representative of the different types of virus groups, introduction general laboratory, virus-host interactions, virus-vector biology, and diagnostic methods ecology, and evolutionary aspects.			
PLS 340	Introduction to Biotechnology	Survey of both the basic concepts and techniques used in the analysis and improvement of biological organisms by genetic engineering and cell culture as well as examples of biotechnology improvements that have been made in various organisms. The course covers topics ranging from bioremediation to Cancer Stem Cells.	fall	PLS	Samantha Orchard
PLS 359	Plant Cell Structure and Function	Whether you will work with plants as a physiologist, pathologist, ecologist, agronomist, horticulturist, or molecular biologist, you will need to know how a plant is constructed, how it grows, and how it functions. Depending on the need and your interests, you may work at the subcellular, cellular, tissue, organ, or whole plant level. As a result, it is important to have a comprehensive understanding of plant cell structure and function. In this course, we will start with the molecular and subcellular organization of a single plant cell. Subsequently, we will investigate tissue levels of organization and function. Emphasis will be placed on not only teaching the structural aspects but also discussing the functions of a plant cell, tissue, and organ. Organ and whole plant growth and physiology will be covered in PLS 360 (Plant Growth and Physiology), a course that will be offered in the spring semester.	fall	PLS	Ravishankar Palanivelu
PLS 360	Plant Growth and Physiology	Survey of the fundamental concepts of plant physiology and how those concepts are supported by evidence from physiological, biochemical, biophysical, molecular and genomic experiments. The emphasis is on "whole plant" physiology and how plants work in the real world.	spring	PLS	Jesse Woodson

XIII. Emphasis course/faculty information for NEW courses. Complete the table below. Provide email(s)/letter(s) of support from home department head(s) for courses not owned by your department. Add rows as needed. Add rows as needed.

Course	Title	Course Description	Status*	Anticipated first term offered	Typically Offered (F, Sp, Su, W) and Frequency (every year, odd years, etc.)	Home Dept.	Faculty members available to teach the courses
BE 350	Advanced Hydroponic	This is an advanced level course, building on the basic principles covered in BE 217:	A	Spring 2020	spring	BE	Stacy Tollefson

	Crop Production	Introduction to Hydroponics. Students will gain experience in nutrient formulation, fertigation management, and plant health monitoring; design, operation, and cultivation of crops in various types of hydroponic systems and environments (ex. Nutrient Film Technique, Deep Water Culture, aeroponics, aquaponics, mushrooms, vertical farming, supplemental and sole source lighting); and understanding of the principles and challenges in developing organic hydroponic systems. Students will read and analyze primary literature involving hydroponic systems and develop the ability to troubleshoot and solve grower problems.					
BE 350L	Advanced Hydroponic Crop Production Laboratory	This is an advanced level course, building on the basic principles covered in BE 217: Introduction to Hydroponics. Students will gain hands-on experience with various hydroponic and specialty crop production systems such as Nutrient Film Technique (NFT), Deep Water Culture (DWC), bag culture, aquaponics, and gourmet mushroom production. Course will cover nutrient and irrigation management, climate control, integrated pest management, crop scheduling, seeding, transplanting, harvesting, and packaging using GHP/GAP food safety protocols.	A	Spring 2020	spring	BE	Stacy Tollefson
PLS 303	Arboriculture	Humans cultivate trees for many purposes including beauty, shade, wildlife habitat, and food. This course introduces students to the field of arboriculture, which is the study, cultivation, and management of trees and other perennial woody plants. Specifically, this course covers the selection, establishment, and management of landscape trees, which are important considerations in fields such as urban forestry and residential	A	Spring 2020	spring	PLS	Ursula Schuch

		and commercial landscaping. Students will learn tree care concepts based on tree biology and environmental science and acquire relevant knowledge to be able to apply arboriculture principles to urban forestry, landscape planning, design and installation, and landscape management programs.					

*In development (D); submitted for approval (S); approved (A)

XIV. Using the table below, list each faculty member who will contribute to the teaching of courses in this emphasis and the teaching FTE they will contribute. Add rows as needed.

Course(s)	Name	Department	Rank	Degree	Faculty/% effort
BE 350/350L	Stacy Tollefson	Biosystems Engineering	Assistant Professor of Practice	Doctor of Philosophy	BE 350 15% BE 350L 5%
PLS 303	Ursula Schuch	Plant Science	Professor	Doctor of Philosophy	10%

XV. **Special conditions for admission to/declaration of this emphasis** – explain in detail the criteria to declare this emphasis, including GPA requirements, completion of courses prior to declaration, application process, interviews, etc. These conditions must be approved by faculty governance to be enforced.

no special conditions

XVI. **Emphasis productivity** – provide a detailed plan in the case the emphasis does not attract the number of anticipated students and/or the new courses have low enrollments. Will emphasis courses continue to be offered as described in Section XIII and XIV or will students be offered alternative courses from outside the emphasis as substitutions? Is the department/school/college committed to offering the courses regardless of the emphasis productivity?

The *Urban Horticulture* emphasis area replaces the existing *Environmental Horticulture* emphasis. *Environmental Horticulture* has been the smallest of the four emphases, with 6 students. We expect to attract more students to *Urban Horticulture*, based on needs expressed to advisors by current and former students, and expanding employment opportunities in this area. However, two of the core emphasis area courses are required in other degree programs, and are not dependent on *Urban Horticulture* students. PLS 235 *Introduction to Horticulture* is required in the *Controlled Environment Agriculture* emphasis of the *Sustainable Plant Systems* degree, which is the largest emphasis (currently with 22 students). LAR 420 *Plant Materials* is a core selective in the *Sustainable Built Environments* major, in the *Sustainable Landscapes* emphasis of the *Sustainable Built Environments* major, and in the *Sustainable Built Environments* minor. PLS 303 *Arboriculture* is a new course, developed specifically for the *Urban Horticulture* emphasis.

If the Urban Horticulture emphasis does not attract additional students, only PLS 303 would be affected. The School of Plant Science is committed to this course regardless of the emphasis productivity if there is adequate student interest.

XVII. **Do you want the emphasis name to appear on the transcript? ☒ Yes ☐ No**

XVIII. **Do you want the emphasis name to appear on the diploma? ☒ Yes ☐ No**

XIX. **Anticipated semester and year to launch the proposed emphasis:** Fall, 2020

XVII. **Number of new faculty hires required to deliver the emphasis:** none

XVIII. **Budgetary impact**– indicate new resources needed and source of funding to implement the proposed emphasis. If reallocating resources, indicate where resources will be taken from and the impact this will have on the students/faculty/program/unit.

No additional budgetary resources are required for this emphasis area.

Decision process for approval will include:
1) efficiency of course offerings.
2) course offerings are appropriate and match the expertise of the faculty.
3) evidence of sufficient student demand.
3) no major conflict with existing programs.

XXIII. Required signatures

Managing Unit Administrator (print name and title): Dr. Kitt Farrell-Poe, Head of Biosystems Engineering Department

Managing Administrator's Signature: K. L. Farrell-Poe Date: 10/16/19

Managing Unit Administrator (print name and title): Dr. Jon Chorover, Head of Environmental Science Department

Managing Administrator's Signature: Jon Chorover Date: 10/16/2019

Managing Unit Administrator (print name and title): Dr. Matt Jenks, Director of the School of Plant Sciences

Managing Administrator's Signature: Matthew A. Jenks Date: 10/16/2019

Dean (print name and title): Michael Staten, Associate Dean

Dean's Signature: Michael Staten Date: 10/16/2019

Dean (printed name and title): _____

Dean's Signature: _____ Date: _____

All programs that will be offered through distance learning and/or fully online must include the following signature. The signature of approval does not indicate a commitment to invest in this program. Any potential investment agreement is a separate process.

Joel Hauff, Associate Vice President Academic Initiatives and Student Success and Executive Director for Online and Distance Education Administration

Signature: _____ Date: _____

Note: In some situations, signatures of more than one unit head and/or college dean may be required.

For use by Curricular Affairs:

Committee	Approval date
Academic Programs Subcommittee	
Undergraduate Council	
College Academic Administrators Council	

☐ Create approval memo
☐ Send memo to college/dept and acad_org listserv
☐ Create emphasis code in UAccess, including secondary major emphasis code
☐ Upload approval memo and proposal documents to UAccess

☐ Notify acad_org of the plan code creation
☐ Notify ADVIP team, include proposers

Sustainable Plant Systems Major

Department/School	Class	Contact	Date Sent	Response Date
Animal & Comparative Biomedical Sciences	ACBS 411 ACBS 437 ACBS 456 MIC 430	spstock@email.arizona.edu	10/9/2019 11/13/2019	11/14/2019
Agricultural Education	AGTM 200 AGTM 330 AGTM 375 AGTM 350 AGTM 351 ASM 392, 3 ASM 404 ASM 499	rtorres@email.arizona.edu	10/9/2019	10/11/2019
American Indian Studies	AIS 441A	sakiestewa@email.arizona.edu	10/9/2019	10/14/2019
Agricultural & Resource Economics	AREC 239	garyt@ag.arizona.edu	10/9/2019 11/13/2019	11/13/2019
Chemistry & Biochemistry	BIOC 384	sanov@u.arizona.edu	10/9/2019	10/9/2019
Computer Science	CSC 250	proebsting@email.arizona.edu	10/9/2019	10/16/2019
Ecology & Evolutionary Biology	ECOL 414	worobey@email.arizona.edu	10/9/2019 11/13/2019	11/26/2019
Entomology	ENTO 300 ENTO 310 ENTO 468	brucet@ag.arizona.edu	10/9/2019	10/9/2019
School of Geography & Development	GEOG 330	liverman@email.arizona.edu	10/9/2019	10/10/2019
Landscape & Architecture Planning	LAR 350 LAR 420 LAR 423 PLG 408 SBE 201	ljohnson@email.arizona.edu	10/9/2019	10/10/2019
School of Natural Resources & the Environment	RNR 310 RNR 400 RNR 403 RNR417 RNR 483	squirrel@ag.arizona.edu	10/9/2019	10/9/2019

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Trent Patrick Rodriguez <trentrodriguez@email.arizona.edu>

Use of ACBS course in the B.S. Sustainable Plant Systems curriculum

8 messages

Trent Patrick Rodriguez <trentrodriguez@email.arizona.edu> Wed, Oct 9, 2019 at 10:09 AM
To: environmentalscience@email.arizona.edu

spstock@email.arizona.edu
Dear Dr. Stock,

The Department of Environmental Science is proposing significant changes to the Sustainable Plant Systems BS program. We would like to include one or more courses offered by your academic unit as subplan selectives and a subplan requirement in the major. Currently, there are 48 majors in the program, so the enrollment will not be significant. As part of the approval process we need to include a memorandum of support from you. We would be grateful if you would please review the attached information and sign the attached memorandum if you can. An electronic signature is fine. If you have any questions or concerns about our request, please let me know.

Once you have signed the memorandum, please return to me by email.

Sincerely,

Jon Chorover

Professor and Head

Department of Environmental Science

University of Arizona

Tucson, AZ 85721-0038

Phone: (520) 621-1646

Fax: (520) 621-1647

Email: chorover@email.arizona.edu

ACBS major selective request 10.4.2019.docx
24K

Environmental Science <EnvironmentalScience@email.arizona.edu> Wed, Oct 9, 2019 at 10:30 AM
To: "Stock, S. Patricia - (spstock)" <spstock@email.arizona.edu>

Dear Dr. Stock,

The Department of Environmental Science is proposing significant changes to the Sustainable Plant Systems BS program. We would like to include one or more courses offered by your academic unit as subplan selectives and a subplan requirement in the major. Currently, there are 48 majors in the program, so the enrollment will not be significant. As part of the approval process we need to include a memorandum of support from you. We would be grateful if you would please review the attached information and sign the attached memorandum if you can. An electronic signature is fine. If you have any questions or concerns about our request, please let me know.

Once you have signed the memorandum, please return to me by email.

Sincerely,

Jon Chorover
Professor and Head
Department of Environmental Science
University of Arizona
Tucson, AZ 85721-0038
Phone: (520) 621-1646
Fax: (520) 621-1647
Email: chorover@email.arizona.edu<mailto:chorover@email.arizona.edu>

ACBS major selective request 10.4.2019.docx
24K

Landeen, Kathleen A - (klandeen) <klandeen@email.arizona.edu> Wed, Nov 13, 2019 at 10:16 AM
To: "Stock, S. Patricia - (spstock)" <spstock@email.arizona.edu>
Cc: "Rodriguez, Trent Patrick - (trentrodriguez)" <trentrodriguez@email.arizona.edu>

[Quoted text hidden]

ACBS major selective request 10.4.2019.docx
24K

Stock, S. Patricia - (spstock) <spstock@email.arizona.edu> Wed, Nov 13, 2019 at 2:48 PM
To: "Landeen, Kathleen A - (klandeen)" <klandeen@email.arizona.edu>
Cc: "Rodriguez, Trent Patrick - (trentrodriguez)" <trentrodriguez@email.arizona.edu>

Dear Kathleen:
We can allow the listing of these courses but with some limitations. Please see below:

ACBS 411 Agriculture, Environmental and Legal Issues; subplan option - Can be used but this will be reserved for all ACBS students first

ACBS 437 Food Safety Laws and Legal Policies; subplan option Can be used but this will be reserved for all ACBS students first

ACBS 456 Aquaculture; subplan option- Can be used but this will be reserved for all ACBS students first

MIC 430 Micro & Food; subplan requirement- This is in Food Safety Core and would like to reserve this for our students, being only available if our cap enrollment is not met.

If this still works for you, I am OK with signing the form. Just let me know.

Cheers,

Dr. S. Patricia Stock
Director and Professor, School of Animal and Comparative Biomedical Sciences
Weiler Endowed Chair for Excellence in Agriculture and Life Sciences
The University of Arizona
1117 E. Lowell St. P.O. Box 210090 Tucson, AZ 85721
Office: +1-520-621-0868 Fax:+1- 520-626-5602
e-mail: spstock@email.arizona.edu
URL: https://acbs.cals.arizona.edu/people/s-patricia-stock

Additional Appointments:
Professor, Department of Entomology
Professor, Honors College

Lab address: Marley Bldg. Room 718/720/724
1145 E. 4th Street, Tucson AZ 85721
Lab Phone (+1-520) 621-1317

_____
From: Landeen, Kathleen A - (klandeen) <klandeen@email.arizona.edu>
Sent: Wednesday, November 13, 2019 10:16 AM
To: Stock, S. Patricia - (spstock) <spstock@email.arizona.edu>
Cc: Rodriguez, Trent Patrick - (trentrodriguez) <trentrodriguez@email.arizona.edu>
Subject: Use of ACBS course in the B.S. Sustainable Plant Systems curriculum
[Quoted text hidden]

winmail.dat
35K

Landeen, Kathleen A - (klandeen) <klandeen@email.arizona.edu> Thu, Nov 14, 2019 at 9:11 AM
To: "Stock, S. Patricia - (spstock)" <spstock@email.arizona.edu>
Cc: "Rodriguez, Trent Patrick - (trentrodriguez)" <trentrodriguez@email.arizona.edu>, "Walworth, Jim - (jlw1)" <Walworth@ag.arizona.edu>

Good morning:

The limitations you described are reasonable. Thank you for allowing SPS students to use ACBS courses as allowed by seat availability. We look forward to receiving you signed form and will include a copy of this thread with the MEMO.

Kathleen Landeen

From: Stock, S. Patricia - (spstock) <spstock@email.arizona.edu>
Sent: Wednesday, November 13, 2019 2:48 PM
To: Landeen, Kathleen A - (klandeen) <klandeen@email.arizona.edu>
Cc: Rodriguez, Trent Patrick - (trentrodriguez) <trentrodriguez@email.arizona.edu>
Subject: Re: Use of ACBS course in the B.S. Sustainable Plant Systems curriculum

Dear Kathleen:
We can allow the listing of these courses but with some limitations. Please see below:

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ACBS 456 Aquaculture; subplan option- Can be used but this will be reserved for all ACBS students first

MIC 430 Micro & Food; subplan requirement- This is in Food Safety Core and would like to reserve this for our students, being only available if our cap enrollment is not met.

If this still works for you, I am OK with signing the form. Just let me know.

Cheers,

_____
Dr. S. Patricia Stock
Director and Professor, School of Animal and Comparative Biomedical Sciences
Weiler Endowed Chair for Excellence in Agriculture and Life Sciences

The University of Arizona
1117 E. Lowell St. P.O. Box 210090 Tucson, AZ 85721
Office: +1-520-621-0868 Fax:+1- 520-626-5602
e-mail: spstock@email.arizona.edu<mailto:spstock@email.arizona.edu>
URL: https://acbs.cals.arizona.edu/people/s-patricia-stock

Additional Appointments:
Professor, Department of Entomology
Professor, Honors College

Lab address: Marley Bldg. Room 718/720/724
1145 E. 4th Street, Tucson AZ 85721
Lab Phone (+1-520) 621-1317

_____

From: Landeen, Kathleen A - (klandeen) <klandeen@email.arizona.edu<mailto:klandeen@email.arizona.edu>>
Sent: Wednesday, November 13, 2019 10:16 AM
To: Stock, S. Patricia - (spstock) <spstock@email.arizona.edu<mailto:spstock@email.arizona.edu>>
Cc: Rodriguez, Trent Patrick - (trentrodriguez) <trentrodriguez@email.arizona.edu<mailto:trentrodriguez@email.arizona.edu>>
[Quoted text hidden]

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winmail.dat
24K

Stock, S. Patricia - (spstock) <spstock@email.arizona.edu> Thu, Nov 14, 2019 at 11:01 AM
To: "Landeen, Kathleen A - (klandeen)" <klandeen@email.arizona.edu>
Cc: "Rodriguez, Trent Patrick - (trentrodriguez)" <trentrodriguez@email.arizona.edu>, "Walworth, Jim - (jlw1)" <Walworth@ag.arizona.edu>

Kathleen: please find attached signed memo.
Cheers,

Patricia

_____

Dr. S. Patricia Stock
Director and Professor, School of Animal and Comparative Biomedical Sciences
Weiler Endowed Chair for Excellence in Agriculture and Life Sciences
The University of Arizona
1117 E. Lowell St. P.O. Box 210090 Tucson, AZ 85721
Office: +1-520-621-0868 Fax:+1- 520-626-5602
e-mail: spstock@email.arizona.edu
URL: https://acbs.cals.arizona.edu/people/s-patricia-stock

Additional Appointments:
Professor, Department of Entomology
Professor, Honors College

Lab address: Marley Bldg. Room 718/720/724
1145 E. 4th Street, Tucson AZ 85721
Lab Phone (+1-520) 621-1317

_____

From: Landeen, Kathleen A - (klandeen) <klandeen@email.arizona.edu>
Sent: Thursday, November 14, 2019 9:11 AM
To: Stock, S. Patricia - (spstock) <spstock@email.arizona.edu>
Cc: Rodriguez, Trent Patrick - (trentrodriguez) <trentrodriguez@email.arizona.edu>; Walworth, Jim - (jlw1) <Walworth@ag.arizona.edu>
Subject: RE: Use of ACBS course in the B.S. Sustainable Plant Systems curriculum

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FAX: (520) 621-1647
swes.cals.arizona.edu

MEMO

DATE: **October 4, 2019**

TO: **S. Patricia Stock, Professor and Director, Animal & Comparative Biomedical Sciences**

FROM: **Jon Chorover, Professor and Head, Environmental Science**

RE: **Use of ACBS course in the B.S. Sustainable Plant Systems curriculum**

We approve the course(s) for use in the undergraduate curriculum for the **Sustainable Plant Systems** degree, SPSBS, as specified below:

ACBS 411 Agriculture, Environmental and Legal Issues; subplan option
ACBS 437 Food Safety Laws and Legal Policies; subplan option
ACBS 456 Aquaculture; subplan option
MIC 430 Micro & Food; subplan requirement

Managing Administrator: Patricia Stock, Ph.D.

Managing Administrator's Signature: _____ Date:_____

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FAX (520) 621-1647
swes.cals.arizona.edu

MEMO

DATE: October 4, 2019

TO: Robert Torres, Professor and Head, Agricultural Education

FROM: Jon Chorover, Professor and Head, Environmental Science

RE: Use of AED course in the B.S. Sustainable Plant Systems curriculum

We approve the course(s) for use in the undergraduate curriculum for the **Sustainable Plant Systems** degree, SPSBS as specified below:

AGTM 200 Solar Photovoltaic Energy Systems with Applications to Agriculture; subplan option
AGTM 330 Turf and Landscape Technology; subplan option
AGTM 375 Agriculture Law; subplan option
AGTM 350 Applications in Agricultural Mechanics; subplan option
AGTM 351 Operations in Agricultural Mechanics; subplan option
ASM 392,393, 399, 492, 493, 498H, 499 Experiential Learning; core option
ASM 404 Irrigation Principles and Management (Yuma); core option
ASM 499 Independent Study; core requirement

Managing Administrator: Robert Torres, Professor and Head, AED

Managing Administrator's Signature: Robert Torres Date: 10/11/19

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FAX: (520) 621-1647
swes.cals.arizona.edu

MEMO

DATE: **October 4, 2019**

TO: **Matthew Sakiestewa Gilbert, Professor and Head, American Indian Studies**

FROM: **Jon Chorover, Professor and Head, Environmental Science**

RE: **Use of AIS course in the B.S. Sustainable Plant Systems curriculum**

We approve the course(s) for use in the undergraduate curriculum for the **Sustainable Plant Systems** degree, SPSBS as specified below:

AIS 441A Natural Resource Management in Native Communities; subplan option

Managing Administrator: Matthew Sakiestewa Gilbert, Professor and Head, American Indian Studies

Managing Administrator's Signature: _____ Date: 10/10/2019

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swes.cals.arizona.edu

MEMO

DATE: **October 4, 2019**

TO: **Gary Thompson, Professor and Department Head, Agricultural & Resource Economics**

FROM: **Jon Chorover, Professor and Head, Environmental Science**

RE: **Use of AREC course in the B.S. Sustainable Plant Systems curriculum**

We approve the course(s) for use in the undergraduate curriculum for the **Sustainable Plant Systems** degree, SPSBS as specified below:

AREC 239 Introduction to Statistics and Data Analysis; core option

Managing Administrator: Gary Thompson, Professor and Department Head, Agricultural & Resource Economics

Managing Administrator's Signature: _____ Date: 11-13-19

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swes.cals.arizona.edu

MEMO

DATE: **October 4, 2019**

TO: **Andrei Sanov, Professor and Head, Chemistry & Biochemistry**

FROM: **Jon Chorover, Professor and Head, Environmental Science**

RE: **Use of BIOC course in the B.S. Sustainable Plant Systems curriculum**

We approve the course(s) for use in the undergraduate curriculum for the **Sustainable Plant Systems** degree, SPSBS as specified below:

BIOC 384 Foundations in Biochemistry; subplan option

Managing Administrator: Andrei Sanov, Professor and Head, Chemistry & Biochemistry

Managing Administrator's Signature: A. Sanov Date: 10/9/2019

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Trent Patrick Rodriguez <trentrodriguez@email.arizona.edu>

Use of CSC course in the B.S. Sustainable Plant Systems curriculum

4 messages

Trent Patrick Rodriguez <trentrodriguez@email.arizona.edu> Wed, Oct 9, 2019 at 10:16 AM
To: environmentalscience@email.arizona.edu

proebsting@email.arizona.edu
Dear Dr. Proebsting,

The Department of Environmental Science is proposing significant changes to the Sustainable Plant Systems BS program. We would like to include one or more courses offered by your academic unit as a requirement in the major. Currently, there are 48 majors in the program, so the enrollment will not be significant. As part of the approval process we need to include a memorandum of support from you. We would be grateful if you would please review the attached information and sign the attached memorandum if you can. An electronic signature is fine. If you have any questions or concerns about our request, please let me know.

Once you have signed the memorandum, please return to me by email.

Sincerely,

Jon Chorover

Professor and Head

Department of Environmental Science

University of Arizona

Tucson, AZ 85721-0038

Phone: (520) 621-1646

Fax: (520) 621-1647

Email: chorover@email.arizona.edu

CSC major selective request 10.4.2019.docx
24K

Trent Patrick Rodriguez <trentrodriguez@email.arizona.edu> Wed, Oct 9, 2019 at 10:44 AM
To: environmentalscience@email.arizona.edu

[Quoted text hidden]

CSC major selective request 10.4.2019.docx
24K

Environmental Science <EnvironmentalScience@email.arizona.edu> Wed, Oct 9, 2019 at 10:48 AM
To: "Proebsting, Todd A - (proebsting)" <proebsting@email.arizona.edu>

Dear Dr. Proebsting,

The Department of Environmental Science is proposing significant changes to the Sustainable Plant Systems BS program. We would like to include one or more courses offered by your academic unit as a requirement in the major. Currently, there are 48 majors in the program, so the enrollment will not be significant. As part of the approval process we need to include a memorandum of support from you. We would be grateful if you would please review the attached information and sign the attached memorandum if you can. An electronic signature is fine. If you have any questions or concerns about our request, please let me know.

Once you have signed the memorandum, please return to me by email.

Sincerely,

Jon Chorover
Professor and Head
Department of Environmental Science
University of Arizona
Tucson, AZ 85721-0038
Phone: (520) 621-1646
Fax: (520) 621-1647
Email: chorover@email.arizona.edu<mailto:chorover@email.arizona.edu>

CSC major selective request 10.4.2019.docx
24K

Environmental Science <EnvironmentalScience@email.arizona.edu> Wed, Nov 13, 2019 at 10:08 AM
To: "Rodriguez, Trent Patrick - (trentrodriguez)" <trentrodriguez@email.arizona.edu>

From: Todd Proebsting <proebsting@cs.arizona.edu>
Sent: Wednesday, October 16, 2019 11:15 AM
To: Environmental Science <EnvironmentalScience@email.arizona.edu>
Subject: Re: Use of CSC course in the B.S. Sustainable Plant Systems curriculum

Jon,
We can certainly handle more students in CSC 250. We should note that Computer Science is very likely to revisit the content of 250 in the next year or two to better serve our constituents. Are you OK with that uncertainty?

Cheers,
Todd
[Quoted text hidden]

winmail.dat
15K

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Department of Environmental Science

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swes.cals.arizona.edu

MEMO

DATE: **October 4, 2019**

TO: **Michael Worobey, Professor and Head, Ecology & Evolutionary Biology**

FROM: **Jon Chorover, Professor and Head, Environmental Science**

RE: **Use of ECOL course in the B.S. Sustainable Plant Systems curriculum**

We approve the course(s) for use in the undergraduate curriculum for the **Sustainable Plant Systems** degree, SPSBS as specified below:

ECOL 414 Plants of the Desert; subplan option

Managing Administrator: Michael Worobey, Professor and Head, EEB

Managing Administrator's Signature: _____ Date: 11/26/2019

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MEMO

DATE: **October 9, 2019**

TO: **Jon Chorover, Professor and Head, Environmental Science**

FROM: **Bruce Tabashnik, Regents' Professor and Head, Entomology**

RE: **Use of ENTO courses in the B.S. Sustainable Plant Systems curriculum**

We approve the courses for use in the undergraduate curriculum for the **Sustainable Plant Systems** degree, SPSBS as specified below:

ENTO 300 Insect Pest Management for Desert Cropping Systems; core option
ENTO 468 Integrated Pest Management; core option
ENTO 310 Living in Symbiosis; subplan option

Managing Administrator: Bruce Tabashnik, Regents' Professor and Head, Entomology

Managing Administrator's Signature:  Date: 10-9-19

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MEMO

DATE: **October 4, 2019**

TO: **Diana Liverman, Director & Regents' Professor,**
School of Geography and Development

FROM: **Jon Chorover, Professor and Head, Environmental Science**

RE: **Use of GEOG course in the B.S. Sustainable Plant Systems curriculum**

We approve the course(s) for use in the undergraduate curriculum for the **Sustainable Plant Systems** degree, SPSBS as specified below:

GEOG 330 Introduction to Remote Sensing; subplan option

Managing Administrator: Diana Liverman, Director & Regents' Professor, SGD

Diana Liverman

October 10, 2019

Managing Administrator's Signature: _____ Date:_____

Department of Environmental Science

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swes.cals.arizona.edu

MEMO

DATE: **October 4, 2019**

TO: **Lauri Johnson, Professor and Director, Landscape Architecture & Planning**

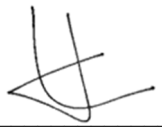
FROM: **Jon Chorover, Professor and Head, Environmental Science**

RE: **Use of LAR course in the B.S. Sustainable Plant Systems curriculum**

We approve the course(s) for use in the undergraduate curriculum for the **Sustainable Plant Systems** degree, SPSBS as specified below:

LAR 350 Parks and Urban Public Spaces; subplan option
LAR 420 Plant Materials; subplan requirement
LAR 423 Landscape Ecology; subplan option
PLG 408 Planning for Urban Resilience; subplan option
SBE 201 Sustainable Design and Planning; subplan option

Managing Administrator: Lauri Johnson, Professor and Director, Landscape Architecture & Planning

Managing Administrator's Signature:  Date: 10/10/2019

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Department of Environmental Science

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Tucson, AZ 85721-0038 USA
(520) 621-1606
FAX: (520) 621-1647
swes.cals.arizona.edu

MEMO

DATE: **October 4, 2019**

TO: **John Koprowski, Professor and Director,**
School of Natural Resources and the Environment

FROM: **Jon Chorover, Professor and Head, Environmental Science**

RE: **Use of RNR course in the B.S. Sustainable Plant Systems curriculum**

We approve the course(s) for use in the undergraduate curriculum for the **Sustainable Plant Systems** degree, SPSBS as specified below:

RNR 310 Agave, Cacti, and Other Succulents of Southern Arizona; subplan option
RNR 400 Noxious Invasive Plants of Arizona; subplan option
RNR 403 Applications of Geographic Information Systems; subplan option
RNR 417 Geographic Information Systems for Natural and Social Sciences; subplan option
RNR 483 Geographic Applications of Remote Sensing; subplan option

Managing Administrator: John Koprowski, Professor and Director, SNRE

Managing Administrator's Signature:  Date: 9 October 2019