MICHIGAN STATE

September 21, 2023

MEMORANDUM

TO:	Dr. Mark Largent, Vice Provost for Undergraduate Education and Dean of Undergraduate Studies
FROM:	Joy Speas, University Curriculum Administrator
RE:	Request for a <u>New</u> Minor in Environmental Soil Science
	For Transmittal to the University Committee on Undergraduate

The request referenced above is being sent to the University Committee on Undergraduate Education (UCUE) in accordance with the Bylaws for Academic

UCUE Response Requested:

Governance, 4.4.

Please ask the committee to consider the request referenced above and provide consultative commentary. Please mail the related materials referenced under the heading Attachments at the end of this memorandum to the committee members.

After receiving the committee's consultative response, the Provost will make a determination to forward or not to forward the request to the University Committee on Curriculum for its approval of curriculum and degree requirements.

If you have any questions, please email me at ucc@msu.edu.

Education (UCUE)

Thank you.

Attachments:

Hannah Admin. Building 426 Auditorium Road Suite 430 East Lansing, MI 48824

Curriculum and

517-355-8420 Fax: 517-355-9601 Request to Establish a New Academic Program form dated May 18, 2023: Minor in Environmental Soil Science and attachments.

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Catalog

1.

COLLEGE OF AGRICULTURE AND NATURAL RESOURCES

1. Request to establish a **Minor** in **Environmental Soil Science** in the Department of Plant, Soil and Microbial Sciences. The University Committee on Undergraduate Education (UCUE) will consider this request at its September 28, 2023 meeting.

a. Background Information:

Soil science has always been an interdisciplinary field involving chemistry, physics, biology, and geology. Most soil science programs have historically focused on row crop production, a vital application of soil science. Soil science also impacts forestry, wetland management, urban stormwater planning, archeology, and many other related disciplines. Soil scientists are hired by Federal agencies including the U.S. Department of Agriculture, the U.S. Forest Service, the U.S. Geological Survey, and the Environmental Protection Agency. These Federal jobs, and many analogous state jobs across the country, require applicants to meet the Federal OPM Soil Science Series 0470 job requirements, which include 15 credits in soil science and at least 30 credits of supporting scientific course work. The Certified Professional Soil Scientist (CPSS) program, administered by the Soil Science Society of America, essentially mirrors these Federal job requirements for many private sector jobs; many soil scientists working in the septic services industry and other industries pursue certification as a CPSS after graduation.

Current MSU students who are interested in pursuing one of these Federal, state, or private sector soil science jobs have limited educational opportunities. If they pursue a B.S. in Crop and Soil Sciences (CSS), they will meet the soil science credit requirements for most jobs, but they will not meet the course work requirements to be competitive applicants for jobs in forest soils, wetland soils, and other environments that are not represented in the CSS curriculum. Similarly, MSU students who pursue majors such as Forestry or Fisheries and Wildlife will find that they have enough supporting course work to pursue jobs in those fields, but that they lack enough soil science credits to apply for soil scientist positions in those diverse environments.

The purpose of the Minor in Environmental Soil Science is to fill this educational gap at MSU. A student who wants to work as a soil scientist in nearly any environment can pursue whatever major they prefer to specialize in an environment (e.g., vineyard, urban, forest, wetland), while pursuing the Minor in Environmental Soil Science in order to meet the specific requirements of many soil science jobs. The minor is flexible enough to allow students who are more generally interested in soil health, regenerative agriculture, and similar topics to still pursue substantial course work in soil science while allowing up to 6 credits of closely related electives.

b. Academic Programs Catalog Text:

The Minor in Environmental Soil Science is intended to serve students and professionals who plan to pursue careers in soil science, soil health, or related agricultural, natural resource, and environmental sciences with a focus on the sustainable management of soils to produce food, fiber, and other products while conserving or regenerating natural and managed ecosystems.

The requirements meet the soil science course work requirements for Federal and state employment as soil scientists, as well as the course work requirements necessary to become a Certified Professional Soil Scientist (CPSS).

At least 9 credits counted towards the requirements for this minor must be unique. Unique credits must not be used to fulfill another university, college, or major requirement in the student's program.

With the approval of the department and college that administer the student's degree program, 6 credits of course work that are used to satisfy the requirements for the minor may also be used to satisfy the requirements for the bachelor's degree.

Students who are interested in enrolling should contact an undergraduate advisor in the Department of Plant, Soil and Microbial Sciences.

Requirements for the Minor in Environmental Soil Science

			CREDI	TS
Complet	te all of t	ne followi	ng courses (15 credits):	
1.	The foll	owing cou	urse (3 credits):	
	CSS	210	Fundamentals of Soil Science	3
2.	Comple	te 12 cre	dits from the following, with a minimum of 6 credits in	
	Soil Sci	ence cou	rses:	
	Soil Sci	ence		
	CE	312	Soil Mechanics	4
	CSS	203	World of Soils	2
	CSS	330	Soil Chemistry	2
	CSS	340	Applied Soil Physics	2
	CSS	360	Soil Biology	2
	CSS	470	Soil Resources	3
	CSS	480	Soil Fertility and Management	3
	Annrove	ed Flectiv	es	Ŭ
	ANS	418	Animal Agriculture and the Environment	3
	CF	418	Geotechnical Engineering	3
	CSS	411	Fire and Environmental Quality	3
	CSS	420	Cover Crops in Agroecosystems	3 3
	CSS	442	Agricultural Ecology	3
	CSS	460	Plant-Microbe Interactions	3
	CSS	488	Agricultural Cropping Systems: Integration	0
	000	400	and Problem Solving	З
	21120	35/	Water Resources Management	3
	2000	153	Watershed Planning and Management	3
	FOR	3/0	Forest Ecology	3
	FOR	406	Applied Forest Ecology: Silviculture	3
	FOR	400	Wildland Fire Ecology and Management	3
		410	Unland Ecology and Management	3
		410 //16	Marine Ecology and Management	3
	F\//	/17	Wetland Ecology and Management	3
	FW/	472	Limpology	3
	GEO	306	Environmental Geomorphology	3
	GEO	324	Remote Sensing of the Environment	1
	GEO	325	Geographic Information Systems	3
	GLC	/11	Hydrogeology	3
		/31	Sedimentology and Stratigraphy	1
		332	Tree Fruit Production and Management	3
	HRT	336	Viticulture and Berry Production	2
	HRT	3/1	Vegetable Production and Management	2
	PIR	102	Riology of Fungi	1
		115	Plant Physiology	7 2
		/18	Plant Systematics	3
		1/1	Plant Ecology	3
				5

Effective Spring 2024.

View a Program				
Joy Speas, Office of the Registrar Monday, 8/28/20				
Program Name: Environmental Soil Science Degree: MNUN Sequence Number: 1	Program Request ID: 5005			
Effective Dates: Spring 2024 - Open Statu	is: Interim Initial Action: New			
	Requested Date: 4/11/2023 9:34:03 AM			
1. Department/School/College:				
40000781 Department of Plant, Soil	and Microbial Sciences			
2. Name of Program:				
Environmental Soil Science				
3. Name of Degree:				
MNUN				
4. Type of Program:	4. Type of Program:			
Minor				
5. Effective Start Semester:				
Spring 2024				
6. Target student audience for the program:				
students interested in sustainable land m	nanagement and soil science			
7. Enrollment:				
What is the expected enrollment per yea	ar: <mark>20</mark>			
What is the minimum enrollment accepta	able: <mark>5</mark>			
8. Source of budget for the program:				
To align academic planning and curricula included in the College's annual planning effective date for the new program must program request will not be forwarded t	ar change, ALL requests for NEW funds must be g letter. Provost approval of new funds and the t align. If funding is not approved, then the o Faculty Senate.			
Internal reallocation				

If new funds, was this request included in the College's annual planning letter? Indicate yes or no. If no, then this is a department or college fund reallocation (If the program is implemented, no additional resources are required.).

9. Projected Costs as compared to other programs in unit:

Same

10. Staff requirement:

How many additional staff will be required: 0

Who will provide the primary instruction. Describe any external linkages(industry, government, etc.):

Barret Wessel (PSM), Thom Nikolai (PSM), Kurt Steinke (PSM), Brian Teppen (PSM), Wei Zhang (PSM), Lisa Tiemann (PSM), Karen Renner (PSM), Krista Isaacs (PSM), Sarah Lebeis (PSM)

11. Will additional equipment be required:

Approximate cost: 0

Source of funding:

12. Will additional library materials be required:

Approximate cost: 0

Source of funding:

13. Will additional space be required:

Type:

Approximate amount:

14. If the program requirements contain a named concentration, do you wish for the concentration to be noted on the student's transcript?:

No

15. Detailed Description:

a. Soil science has always been an interdisciplinary field involving chemistry, physics, biology, and geology. Most soil science programs have historically focused on row crop production, a vital application of soil science. Soil science also impacts forestry, wetland management, urban stormwater planning, archeology, and many other related disciplines. Soil scientists are hired by Federal agencies including the U.S. Department of Agriculture, the U.S. Forest Service, the U.S. Geological Survey, and the Environmental Protection Agency. These Federal jobs, and many analogous state jobs across the country, require applicants to meet the Federal OPM Soil Science Series 0470 job requirements, which include 15 credits in soil science and at least 30 credits of supporting scientific coursework. The Certified Professional Soil Scientist (CPSS) program, administered by the Soil Science Society of America, essentially mirrors these Federal job requirements for many private sector jobs; many soil scientists working in the septic services industry and

other industries pursue certification as a CPSS after graduation.

Current MSU students who are interested in pursuing one of these Federal, state, or private sector soil science jobs have limited educational opportunities. If they pursue a B.S. in Crop and Soil Sciences (CSS), they will meet the soil science credit requirements for most jobs, but they will not meet the coursework requirements to be competitive applicants for jobs in forest soils, wetland soils, and other environments that are not represented in the CSS curriculum. Similarly, MSU students who pursue majors such as Forestry or Fisheries and Wildlife will find that they have enough supporting coursework to pursue jobs in those fields, but that they lack enough soil science credits to apply for soil scientist positions in those diverse environments.

The purpose of the Minor in Environmental Soil Science is to fill this educational gap at MSU. A student who wants to work as a soil scientist in nearly any environment can pursue whatever major they prefer in order to specialize in an environment (e.g., vineyard, urban, forest, wetland), while pursuing the Minor in Environmental Soil Science in order to meet the specific requirements of many soil science jobs. The minor is flexible enough to allow students who are more generally interested in soil health, regenerative agriculture, and similar topics to still pursue substantial coursework in soil science while allowing up to 6 credits of closely related electives.

- b. MSU is already a leading soil science educational institution; and it is the only institution of higher education in the state of Michigan that grants B.S. degrees in Crop and Soil Science or equivalent. The current B.S. degree program in Crop and Soil Sciences has three concentrations that serve many students well, but they focus on preparing students for careers in agronomic sciences, turfgrass management, or further studies in graduate school. Soil science is a broad discipline and soil scientists work in forestry, wetland science, engineering, hydrology, archeology, and in many other allied fields. The diverse array of students interested in soil science careers in these, as well as other environments is not well served by existing programs at MSU.
- c. The Department of Plant, Soil and Microbial Sciences already houses most of the soil science faculty at MSU, offers the majority of the soil science courses at MSU, and offers the only degrees directly related to soil science in the state. It is the logical unit to house the Minor in Environmental Soil Science.
- d. Educational Objectives and Learning Outcomes
 - 1. Develop an understanding of the genesis and distribution of soils and soil materials in natural and managed ecosystems.
 - 2. Understand and assess soil properties that control the transformations and transport of water, nutrients and other solutes, and gases.
 - 3. View soils as dynamic and vital components of diverse natural and managed environments.
- e. Dr. Barret Wessel, in consultation with Drs. Karen Renner and David Gilstrap were instrumental in developing the program. Dr. Wessel will be responsible for implementing the minor.
- f. Program outcomes will be assessed using:

- 1. Existing direct assessment of student work (exams, projects, etc.) for each course the student completes in the minor, completed by the course instructors.
- Students will be asked during their last semester at MSU to complete a curriculum evaluation for the minor. Students majoring in Crop and Soil Sciences will complete the evaluation and also meet with the PSM Department Chair to discuss their experiences and provide suggestions for course additions and other improvements to the minor.
- 3. All instructors within the PSM Department meet at least once each academic year, usually before the beginning of Fall Semester to review course content, evaluate student performance, and implement changes to better address the learning goals and objectives of the academic programs in the PSM Department, including evaluation of minors.
- g. The Minor in Environmental Soil Science is intended to serve students and professionals who plan to pursue careers in soil science, soil health, or related agricultural, natural resource, and environmental sciences with a focus on the sustainable management of soils to produce food, fiber, and other products while conserving or regenerating natural and managed ecosystems.

The curricular requirements have been established so students have the option to meet the soil science coursework requirements for Federal and state employment as soil scientists, as well as the coursework requirements necessary to become a Certified Professional Soil Scientist (CPSS). Students interested in careers as Federal, state, or Certified Professional Soil Scientists should speak with an academic advisor and should plan to take 12 soil science credits from the list under '2a'.

At least 9 credits counted towards the requirements for this minor must be unique. Unique credits must not be used to fulfill another university, college, or major requirement in the student's program.

Students who plan to complete the program should consult the undergraduate advisor in the Department of Plant, Soil and Microbial Sciences.

Requirements for the Minor in Environmental Soil Science (15 credits):

1. The following course (3 credits):

- a. CSS 210 Fundamentals of Soil Science
- 2. Complete at least 12 credits from the following. A minimum of 6 credits must come from the soil science courses in 'a'.

3

а	a. Soil Science courses					
	CSS	203	World of Soils		2	
	CSS	330	Soil Chemistry		2	
	CSS	340	Applied Soil Physics		2	
	CSS	360	Soil Biology		2	
	CSS	470	Soil Resources		3	
	CSS	480	Soil Fertility and Management		3	
	CE	312	Soil Mechanics		4	

b. Closely related electives

0030	iy ieic		
ANS	418	Animal Agriculture and the Environment	3
CE	418	Geotechnical Engineering	3
CSS	411	Fire and Environmental Quality	3
CSS	420	Cover Crops in Agroecosystems	3
CSS	442	Agricultural Ecology	3
CSS	460	Plant-Microbe Interactions	3
CSS	488	Integrated Cropping Systems	3
CSUS	5 354	Water Resources Management	3
CSUS	5 453	Watershed Planning and Management	3
FOR	340	Forest Ecology	3
FOR	406	Applied Forest Ecology: Silviculture	3
FOR	413	Wildland Fire Ecology and Management	3
FW	410	Upland Ecosystem Management	3
FW	416	Marine Ecosystem management	3
FW	417	Wetland Ecology and Management	3
FW	472	Limnology	3
GEO	306	Environmental Geomorphology 📠	3
GEO	324	Remote Sensing of Environment	4
GEO	325	Geographic Information Systems	3
GLG	411	Hydrogeology	3
GLG	431	Sedimentology and Stratigraphy	4
HRT	332	Tree Fruit Production and Management	3
HRT	336	Viticulture and Berry Production	2
HRT	341	Vegetable Production and Management	3
PLB	402	Biology of Fungi	4
PLB	415	Plant Physiology	3
PLB	418	Plant Systematics	3
PLB	441	Plant Ecology	3

h. Program and courses will be offered at the main campus.

i. No associated certificate program.

j. Other information:

N/A

16. Are there admissions requirements for this program?:

Grade or grade-point average requirements and if so in which course(s), portfolio requirement, audition, essay, etc. If there are not admission requirements other than those required by the University policy indicate "none".

none

signoffs requested from CE, AMS, CSMS, FOR, FM, GEO, GLG, HRT

DEPARTMENT LEVEL APPROVAL STATUS

Approved: Department of Plant, Soil and Microbial Sciences 4/25/2023 12:43:35 PM by Mackenzie Graham for Brian P. Horgan, Chairperson

COLLEGE LEVEL APPROVAL STATUS

Approved: College of Agriculture and Natural Resources 5/18/2023 8:46:25 AM by Dorcia Chaison for Kelly Millenbah, Associate Dean

Comments: approved at CCC April 20

Call us: (517) 355-3300

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Speas, Joy

From:	Wessel, Barret
Sent:	Tuesday, September 12, 2023 1:44 PM
To:	Ernst, Catherine
Cc:	Speas, Joy
Subject:	RE: New minor in Environmental Soil Science
Follow Up Flag:	Flag for follow up
Flag Status:	Flagged

Hello Cathy,

Thank you for approving this, and for the additional information about ANS 418. I am glad that the course will still be on the books, even if there will be a gap in offering it. Cheers, Barret

From: Ernst, Catherine <ernstc@msu.edu>
Sent: Tuesday, September 12, 2023 1:29 PM
To: Wessel, Barret <wesselba@msu.edu>
Subject: RE: New minor in Environmental Soil Science

Barret,

It is fine with Animal Science for you to include ANS 418 as an elective in your new minor. However, I have to let you know that I don't know when we will next be able to offer this course because the faculty member who taught it retired in August and we don't have any other faculty members with the expertise and/or time to offer the course. We intend to offer this course again in the future when we hire an appropriate faculty member but I don't have a timeline for when this might be.

Cathy

Catherine W. Ernst, PhD (she/her)

Professor and Chair Department of Animal Science Michigan State University Phone: 517-432-1941 canr.msu.edu/ans/



From: Wessel, Barret <<u>wesselba@msu.edu</u>>
Sent: Tuesday, September 12, 2023 12:13 PM
To: Ernst, Catherine <<u>ernstc@msu.edu</u>>
Subject: New minor in Environmental Soil Science

Hello Dr. Ernst,

I am working on a new minor in Environmental Soil Science (program attached), and I would like to include ANS 418 as an elective in the minor to make it more accessible to students who might have an interest in added recognition for taking additional courses in soil science. The minor is intended to be flexible and to compliment a variety of majors here at MSU, while limiting double-dipping on credits. I have attached the current form of the minor, which has passed my departmental and college review.

I am seeking approval from someone with authority in your department, for the current draft of the minor. If approved, an email would suffice, which I will forward to Joy Speas, University Curriculum Administrator. I'm happy to answer any questions about this.

Thank you, Barret Wessel

Barret M Wessel, PhD Assistant Professor of Soil Science Department of Plant, Soil and Microbial Sciences Michigan State University 1066 Bogue St Rm A160-C East Lansing, MI 48824

Speas, Joy

From:	Wessel, Barret
Sent:	Wednesday, September 13, 2023 12:42 PM
To:	Schneider, Jim
Cc:	Speas, Joy
Subject:	RE: New soil science minor?
Follow Up Flag:	Flag for follow up
Flag Status:	Flagged

Hello Jim, Thank you for the message. I appreciate your feedback on this. Cheers, Barret

From: Schneider, Jim <schne181@msu.edu> Sent: Wednesday, September 13, 2023 12:10 PM To: Wessel, Barret <wesselba@msu.edu> Subject: Re: New soil science minor?

Hi

You reached out to me back in February about this minor, and it appears you made the changes I suggested. <u>We're fine with listing FW 410, 416, 417 and 472</u>. Students will need to have completed BS 162 to be able to enroll in these courses. But the way the minor is structured, I'm hoping FW students would be interested in picking it up.

Good luck. Will watch for it at UCC.

Jim

From: Wessel, Barret <<u>wesselba@msu.edu</u>>
Date: Tuesday, September 12, 2023 at 12:03 PM
To: Schneider, Jim <<u>schne181@msu.edu</u>>
Subject: RE: New soil science minor?

Hello Jim,

As you may have seen, the new minor in Environmental Soil Science in CANR (program attached) has been progressing through stages of approval. I would like to include several FW courses as electives in the minor to make it more accessible to students who might have an interest in added recognition for taking additional courses in soil science. The minor is intended to be flexible and to compliment a variety of majors here at MSU, while limiting double-dipping on credits. I have attached the current form of the minor, which has passed my departmental and college review. This version does take your earlier feedback into consideration.

I am seeking approval from someone with authority in your department, for the current draft of the minor. If approved, an email would suffice, which I will forward to Joy Speas, University Curriculum Administrator. I'm happy to answer any questions about this.

Thank you, Barret Wessel

From: Schneider, Jim <<u>schne181@msu.edu</u>>
Sent: Monday, February 6, 2023 4:19 PM
To: Wessel, Barret <<u>wesselba@msu.edu</u>>
Subject: Re: New soil science minor?

I'm on CCC and UCC so I'll see it again once you forward it out of your DCC.

From: Wessel, Barret <<u>wesselba@msu.edu</u>> Date: Monday, February 6, 2023 at 4:17 PM To: Schneider, Jim <<u>schne181@msu.edu</u>> Subject: RE: New soil science minor?

Hello Jim,

This is super helpful, thank you! I figured a few of those courses might be mothballed. I'll keep at this and pass it along later this semester once my DCC looks it over. Good luck with the revamp! Cheers, Barret

From: Schneider, Jim <<u>schne181@msu.edu</u>>
Sent: Monday, February 6, 2023 4:11 PM
To: Wessel, Barret <<u>wesselba@msu.edu</u>>
Subject: Re: New soil science minor?

Hi Barret

This is good and bad timing.

We're in the process of revamping our curriculum into 4 unique majors – Fisheries Ecology and Management; Wildlife Ecology and Management; Applied Conservation Biology, and Aquatic Ecology and Management.

Will I'm interested in working with you on this, just not right now. Got to get all our curriculum items through the various channels before we consider working on any minors.

From your list – FW 410, FW 416, FW 417 and FW 472 should all be good.

FW 443 is actually PLB 443. They only offer every other year and fills every time. FW 452 is actually AE 452, and I don't think they've ever offered that course FW 454 is on its way out. We no longer have anyone that can teach or is willing to teach this course.

But when the time comes I'd be happy to promote this minor to our students.

Jim

From: Wessel, Barret <<u>wesselba@msu.edu</u>> Date: Monday, February 6, 2023 at 4:00 PM To: Schneider, Jim <<u>schne181@msu.edu</u>> Subject: New soil science minor?

Hello Mr. Schneider,

I started teaching Fundamentals of Soil Science in PSM last semester and have been working to develop a new minor related to soil science. My intent is to offer a concise package of soils and related landscape management courses that will allow a variety of non-agronomic majors to pursue careers in soil science. Looking at the existing majors here at MSU, I don't see many paths that students might take if they wanted to go into wetland soils work, forest soil management, or conduct research in benthic systems. I'm hoping that a few FW majors (and others) will choose to pursue the minor so that they can open up an additional clade of job opportunities and professional certifications, in addition to those associated with their major.

I would be interested to hear what you think about this and could arrange a chat or meeting if it is convenient for you. I've attached a rough draft of the minor. Right now, it is rather restrictive, but I want to identify some more appropriate courses (from several related majors) to add to the electives list. I am leaning towards FW 410, FW 416, FW 417, FW443, FW 452, FW 454, or FW 472 as options from your department, but I am open to any feedback or suggestions that you might have.

Thank you, Barret Wessel

Speas, Joy

From:	Wessel, Barret
Sent:	Wednesday, September 13, 2023 11:21 AM
To:	Everett, Michael
Cc:	Stebleton, Jeane; Speas, Joy
Subject:	RE: New minor in Environmental Soil Science
Follow Up Flag:	Flag for follow up
Flag Status:	Flagged

Hello Mike, Thank you for the quick turnaround on this! I am glad to have CSUS involved. Cheers, Barret

From: Everett, Michael <everettm@msu.edu>
Sent: Wednesday, September 13, 2023 10:26 AM
To: Wessel, Barret <wesselba@msu.edu>
Cc: Stebleton, Jeane <stebleto@msu.edu>
Subject: Re: New minor in Environmental Soil Science

Barret,

I talked with the instructor of CSUS354/453 and she is supportive of accommodating the courses in the minor. So, we can support the minor from a CSUS perspective moving forward.

Mike

Michael W. Everett, PhD, MSc, FBS Department of Community Sustainability Michigan State University 480 Wilson Road, Room 140 East Lansing, MI 48824-1222 517-581-5888 – Cell DEVELOPER-EMPATHY-INCLUDER-RESTORATIVE-ADAPTABILITY

From: Wessel, Barret <<u>wesselba@msu.edu</u>>
Date: Tuesday, September 12, 2023 at 12:44 PM
To: Everett, Michael <<u>everettm@msu.edu</u>>
Cc: Stebleton, Jeane <<u>stebleto@msu.edu</u>>
Subject: New minor in Environmental Soil Science

Hello Dr. Everett,

I am working on a new minor in Environmental Soil Science in CANR (program attached), and I would like to include several CSUS courses as electives in the minor to make it more accessible to students who might have an interest in recognition for taking additional courses in soil science. The minor is intended to be flexible and to compliment a variety

of majors here at MSU, while limiting double-dipping on credits. I have attached the current form of the minor, which has passed my departmental (PSM) and college review.

I am seeking approval from someone with authority in your department, for the current draft of the minor. If approved, an email would suffice, which I will forward to Joy Speas, University Curriculum Administrator. I'm happy to answer any questions about this.

Thank you, Barret Wessel

Barret M Wessel, PhD Assistant Professor of Soil Science Department of Plant, Soil and Microbial Sciences Michigan State University 1066 Bogue St Rm A160-C East Lansing, MI 48824

DRAFT

DEPARTMENT of PLANT, SOIL and MICROBIAL SCIENCES

Brian Horgan, Chairperson

UNDERGRADUATE PROGRAMS

The department offers a Bachelor of Science degree in Crop and Soil Sciences, with three concentrations: agronomic sciences, turfgrass management, and advanced studies. The undergraduate curriculum is designed to prepare students to apply scientific principles of crop and soil management for careers in agriculture, agribusiness, turfgrass management, government agencies, and related areas.

Students in agronomic science study the close relationship between crop science and soil science. The goal of the crop scientist is to increase plant production, grain guality, and profit by utilizing genetics, breeding, physiology, and pest management. The goal of the soil scientist is to improve soil fertility and the chemical, physical, and microbial characteristics of the soil. These two subjects are combined in agronomic sciences to develop an integrated approach to the management of crops and soils. Demands for new applications are constantly emerging. There are many complex interactions in plant growth and genetics; the physical, chemical, and biological factors involved in improving crop yields; and the soil-plant-animal relationships that determine the sustainability of cropping systems. Department faculty are nationally and internationally recognized for excellence in both the basic and applied plant and soil sciences and work as partners with agricultural industries to serve agriculture, the citizens of Michigan, the nation, and the world. Students are well prepared for employment in various positions within the food production industry to help feed a burgeoning human population, while understanding the importance of agricultural sustainability. They are highly sought by agribusinesses and governmental agencies to help address food production issues for the future.

The Turfgrass Management concentration encompasses many of the same agronomic principles and applies them to the management of grasses for use on golf courses, athletic fields, home lawns, and recreational areas. Turfgrass adds beauty to the landscape, minimizes sound and air pollution, stabilizes the soil, and reduces the heat load on homes through transpirational cooling.

Students in the advanced studies concentration are fully prepared to accept employment upon graduation, but take additional courses to prepare them for graduate study. These include additional

DRAFT

mathematics, chemistry, biochemistry, and statistics courses. The department also offers minors in international agriculture, sustainable agriculture and food systems, and in turfgrass management.

MINOR IN SUSTAINABLE AGRICULTURE AND FOOD SYSTEMS

The Minor in Sustainable Agriculture and Food Systems is designed to foster active learning about agriculture and food systems for undergraduate students from different disciplinary backgrounds. Contemporary agriculture and food systems issues will be considered in biological, ecological, social, and economic contexts.

The minor is available as an elective to students who are enrolled in bachelor's degree programs at Michigan State University. With the approval of the department and college that administers the student's degree program, the courses that are used to satisfy the minor may also be used to satisfy the requirements for the bachelor's degree. The student's program of study must be approved by the Department of Plant, Soil and Microbial Sciences in advance and in writing.

Requirements for the Minor in Sustainable Agriculture and Food Systems

CREDITS

T٢	ie student n	nust complete 15 credits from the following:	
1.	All of the fo	bllowing courses (6 credits):	
	CSS 124	Introduction Sustainable Agriculture and Food System	ms2
	CSS 224	Sustainable Farm and Food Systems Field Studies	1
	CSS 424	Sustainable Agriculture and Food Systems:	
		Integration and Synthesis	3
2.	One or two	o of the following courses (3 to 6 credits):	
	Agricultur	al Sciences	
	CSS 101	Introduction to Crop Science	3
	CSS 360	Soil Biology	3
	CSS 431	International Agricultural Systems	3
	CSS 442	Agricultural Ecology	3
	ENT 479	Organic Pest Management (W)	3
	HNF 150	Introduction to Human Nutrition	3
	HRT 203	Principles of Horticulture	3
	HRT 251	Organic Farming Principles and Practices	3
	HRT 341	Vegetable Production and Management	3
	HRT 486	Biotechnology in Agriculture: Applications and Ethica	l –
		Issues	3
3.	One or two	o of the following courses (3 to 6 credits):	
	Social Sci	ences	
	ABM 400	Public Policy Issues in the Agri-Food System	3
	CSUS343	Community Food and Agricultural Systems	3
	EEP 255	Ecological Economics	3
	EEP 260	World Food, Population and Poverty	3
	GEO 410	Geography of Food and Agriculture	3
	HNF 406	Global Foods and Culture	3

HNF 406 Global Foods and Culture RCAH292B Engagement and Reflection Insert 1

3



MINOR IN ENVIRONMENTAL SOIL SCIENCE

The Minor in Environmental Soil Science is intended to serve students and professionals who plan to pursue careers in soil science, soil health, or related agricultural, natural resource, and environmental sciences with a focus on the sustainable management of soils to produce food, fiber, and other products while conserving or regenerating natural and managed ecosystems.

The requirements meet the soil science course work requirements for Federal and state employment as soil scientists, as well as the course work requirements necessary to become a Certified Professional Soil Scientist (CPSS).

At least 9 credits counted towards the requirements for this minor must be unique. Unique credits must not be used to fulfill another university, college, or major requirement in the student's program.

With the approval of the department and college that administer the student's degree program, 6 credits of course work that are used to satisfy the requirements for the minor may also be used to satisfy the requirements for the bachelor's degree.

Students who are interested in enrolling should contact an undergraduate advisor in the Department of Plant, Soil and Microbial Sciences.

Requirements for the Minor in Environmental Soil Science

-			CREDI	ΓS
Complet	te all of t	he follow	ing courses (15 credits):	
1.	The foll	owing co	urse (3 credits):	
	CSS	210	Fundamentals of Soil Science	3
2.	Comple	te 12 cre	dits from the following, with a minimum of 6 credits in	
	Soil Sci	ence cou	irses:	
	Soil Sci	ence		
	CE	312	Soil Mechanics	4
	CSS	203	World of Soils	2
	CSS	330	Soil Chemistry	2
	CSS	340	Applied Soil Physics	2
	CSS	360	Soil Biology	2
	CSS	470	Soil Resources	3
	CSS	480	Soil Fertility and Management	3
	Approve	ed Electiv	/es	
	ANS	418	Animal Agriculture and the Environment	3
	CE	418	Geotechnical Engineering	3
	CSS	411	Fire and Environmental Quality	3
	CSS	420	Cover Crops in Agroecosystems	3
	CSS	442	Agricultural Ecology	3
	CSS	460	Plant-Microbe Interactions	3
	CSS	488	Agricultural Cropping Systems: Integration	
			and Problem Solving	3
	CSUS	354	Water Resources Management	3
	CSUS	453	Watershed Planning and Management	3
	FOR	340	Forest Ecology	3
	FOR	406	Applied Forest Ecology: Silviculture	3
	FOR	413	Wildland Fire Ecology and Management	3
	FW	410	Upland Ecology and Management	3
	FW	416	Marine Ecology and Management	3
	FW	417	Wetland Ecology and Management	3
	FW	472	Limnology	3
	GEO	306	Environmental Geomorphology	3
	GEO	324	Remote Sensing of the Environment	4
	GEO	325	Geographic Information Systems	3

411	Hydrogeology	3
431	Sedimentology and Stratigraphy	4
332	Tree Fruit Production and Management	3
336	Viticulture and Berry Production	2
341	Vegetable Production and Management	3
402	Biology of Fungi	4
415	Plant Physiology	3
418	Plant Systematics	3
441	Plant Ecology	3
	411 431 332 336 341 402 415 418 441	 411 Hydrogeology 431 Sedimentology and Stratigraphy 332 Tree Fruit Production and Management 336 Viticulture and Berry Production 341 Vegetable Production and Management 402 Biology of Fungi 415 Plant Physiology 418 Plant Systematics 441 Plant Ecology