# Course Change Request

## New Course Proposal

Date Submitted: 01/15/25 11:03 am

## Viewing: EVPP 425 : RS: Ecological Sustainability

Last edit: 02/27/25 10:03 am

Changes proposed by: ykih

### In Workflow

1. **ESP UG Committee**
2. **ESP Chair**
3. **SC Curriculum Committee**
4. SC Assistant Dean
5. Assoc Provost-Undergraduate
6. Registrar-Courses
7. Banner

### Approval Path

1. 01/15/25 11:24 am Younsung Kim (ykih): Approved for ESP UG Committee
2. 02/26/25 3:20 pm Gad Perry (gperry23): Approved for ESP Chair

**Are you completing this form on someone else's behalf?**

Yes

**Requestor:**

| Name | Extension | Email |
|---|---|---|
| Younsung Kim | 5165 | ykih@gmu.edu |

**Effective Term:** Fall 2025

**Subject Code:** EVPP - Environmental Science & Policy **Course Number:** 425

**Bundled Courses:**

**Is this course replacing another course?** Yes

**Old Course Number:**

EVPP 378 - RS: Ecological Sustainability

**Equivalent Courses:** BIOL 379 - RS: Ecological Sustainability

**Catalog Title:** RS: Ecological Sustainability

**Banner Title:** RS: Ecological Sustainability

**Will section titles vary by semester?** No

**Credits:** 4

**Schedule Type:** Lecture w/Lab

**Hours of Lecture or Seminar per week:** 3

**Hours of Lab or Studio per week:** 3

**Repeatable:** May be only taken once for credit, limited to 3 attempts (N3)

**Max Allowable Credits:** 12

**Default Grade Mode:** Undergraduate Regular

**Recommended Prerequisite(s):**
Permission of instructor.

**Recommended Corequisite(s):**
NA

**Required Prerequisite(s) / Corequisite(s) (Updates only):**
EVPP 301 and EVPP 302

**Registrar's Office Use Only - Required Prerequisite(s)/Corequisite(s):**

| And/Or | ( | Course/Test Code | Min Grade/Score | Academic Level | ) | Concurrency? |
|---|---|---|---|---|---|---|
| | | | | | | |

**Registration Restrictions (Updates only):**
NA

**Registrar's Office Use Only - Registration Restrictions:**

**Field(s) of Study:**

**Class(es):**

**Level(s):**

**Degree(s):**

**School(s):**

**Catalog Description:**

Introduces the concepts and applications of several important topics relating to ecological sustainability. Focuses on the role of soils in maintaining and managing environmental quality. Teaches students how to understand and interpret scientific data presented in various types of literature covering ecological sustainability.

**Justification:**

What: creating an EVPP course at the 400 Level

Why: The course number needs to be updated from 300-level course to 400-level course to be eligible for Mason Apex course.

**Does this course cover material which crosses into another department?** No

**Learning Outcomes:**

The course is to develop critical reading and thinking skills related to a chosen topic in Ecological Sustainability. The study will teach students to build, assess, and monitor the trajectory
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of environmental changes while applying as well as gaining the knowledge and skills of how to conduct a research project. Two ongoing research themes, Nature-Based Solutions (NBS) and Soil Ecosystem will be emphasized in Spring 2025. The class focuses on the literacy and science of ecological restoration and biogeochemistry for environmental sustainability. Students will gain a decent level of literacy of ecological sustainability (especially in both ecosystem services and biodiversity), and hands-on experience in
conducting a field-based experiment to collect, analyze, and effectively communicate environmental data.

**Will this course be scheduled as a cross-level cross listed section?** No

**Attach Syllabus**

EVPP 425 Syllabus-AHN 120124.pdf

**Additional Attachments**

**Staffing:**

ESP will support the course with teaching assistance while the assistance will be subject to GTA availability.

**Relationship to Existing Programs:**

The course will serve as Apex course for EVPP students.

**Relationship to Existing Courses:**

This course is proposed from EVPP 378 which has been used as the ESP department's capstone course.

**Additional Comments:**

**Reviewer Comments**

**Gregory Craft (gcraft) (02/27/25 10:03 am):** updated justification wording to fit the "what" and "why" COSCC proposal requirements.

Key: 18892

**EVPP 425** **SPRING 2025**

# Ecological Sustainability


| | |
|---|---|
| **INSTRUCTOR:** | **Dr. Changwoo Ahn** |
| | Professor of Environmental Science and Policy |
| **OFFICE:** | 3034 David King Hall (office hour: by appoint. or after Thur class) |
| **PHONE:** | (703) 993-3978 |
| **E-MAIL:** | cahn@gmu.edu |
| **WEBSITE:** | http://www.changwooahn.com |


| | |
|---|---|
| **CLASS TIME:** | Lecture/Discussion: 3 pm -4:15 pm, Tuesdays/Thursdays |
| | Lab/Field: Wednesdays 1:30 PM-4:10 PM |
| **LOCATION** | Lecture: Aquia Building 346 |
| | Lab & Fields (DK 3031or Wetland Mesocosm Compound) |
| **CREDIT HOURS:** | 4 |
| **PREREQUISITE:** | BIOL 308 or permission of instructor. |
| **REQUIRED TEXT:** | Reading materials/handouts from various sources will be provided |

## RS COURSE (also as Mason Apex) STATEMENT

This Mason Apex course is designed as a Research and Scholarship (RS) Intensive course, which means the students are given an opportunity to actively participate in the process of research and scholarship training. Thus, in this class, you will be critically reading and studying literature that is original and relevant in both scope and subject matter. Through this kind of authentic inquiry in the *interdisciplinary* approach, you will learn first-hand what it means to produce scholarship in Ecological Sustainability Sciences.

In this RS course, students will:
1) Build their understanding of an original RS project via critical literature study on complex environmental topics/issues.
2) Communicate knowledge from a scholarly project through various media presentations (e.g., creative writing, photos, video clips, short documentaries, etc.)
3) Engage in the scholarly inquiry by:

- Articulating and refining a scientific hypothesis and/or a specific question for the study's goal to be provided
- Gathering evidence appropriate to the question by applying necessary lab/field methodologies
- Synthesizing knowledge obtained from all class activities to discuss the outcomes of projects
- Applying appropriate scholarly conventions when reporting the results of the project- Peer and/or near-peer presentations will be part of communicating the outcomes of the research project. For final papers, a science paper writing workshop will be provided

## COURSE GOALS & LEARNING OUTCOMES

The course is to develop critical reading and thinking skills related to a chosen topic in Ecological Sustainability. The study will teach students to build, assess, and monitor the trajectory

of environmental changes while applying as well as gaining the knowledge and skills of how to conduct a research project. Two ongoing research themes, Nature-Based Solutions (NBS) and Soil Ecosystem will be emphasized in Spring 2025. The class focuses on the literacy and science of ecological restoration and biogeochemistry for environmental sustainability. Students will gain a decent level of literacy of ecological sustainability (especially in both ecosystem services and biodiversity), and hands-on experience in conducting a field-based experiment to collect, analyze, and effectively communicate environmental data.

**SPECIFIC COURSE OBJECTIVES**

Students will complete the class with **1)** a thorough literature research and discussion on the key issues/concepts, history, culture, and languages of a chosen topic (e.g., nature-based solutions and soil ecology), **2)** exposure to scientific methods to collect/analyze/report the information of a research project for the chosen topic, and **3)** communicating about ecosystem services and biodiversity, and how they support humanity and society, 4) exposure to real-world careers paths in environmental sustainability (via specifically arranged guest lectures and field trips)

**COURSE STRUCTURE AND FORMAT**: The class will be a mixture of lectures, studying literature and presenting its summary, group (and class) discussion, class research project relevant to the theme of the class along with field trips that are relevant to the content of the class. For the field/lab activities, the schedule may be subject to minor changes in response to logistics and weather (& also COVID situations when necessary).

**CLASS DISCUSSION**

The discussion will be greatly facilitated based on the questions from reading summaries for each topic. The instructor will provide students with reading materials for at least a week before discussing the subject matter. Whenever each subject paper contains scientific data presentation interpretation and communication of the data will be covered. Every student must participate individually or as a group in discussion. Blackboard discussion board will be used to facilitate discussion on relevant topics on the topic.

**STUDENT PAPER PRESENTATIONS:**

Each student is required to read papers or book chapters assigned and participate in group presentations (ppts) of those papers. Each student group will present the summary of the paper chosen in class for 15-20 minutes (ppt presentation – ~10 ppt slides recommended) to be followed by leading a discussion session with the entire class. Each member of the group must contribute to the presentation equally while participating in its delivery. The ppt file should be sent to the instructor before the class presentation for feedback. The following may help your preparation for your presentations:

*Professional Poster Presentation by OSCAR at GMU (make sure to check all the details in this website)*
*https://oscar.gmu.edu/students/poster-info/*

*Edward R. Tufte. The visual display of quantitative information, 2nd ed.*
*(http://www.edwardtufte.com/tufte/)*

**FINAL PAPER AND PRESENTATION:**

Each student is required to write a research paper or a research proposal (as an alternative upon discussion with the instructor) based on the designated field study to be conducted throughout the semester. Specifics on the subject and the format will be explained and discussed during the class. A

PowerPoint presentation of each project is also required (15-20 minute presentation and 5 minutes Q &A). Students are allowed to collaborate on final papers, yet individual final submission is required. Students are encouraged to use various media, including photos, videos, and web resources to be creative for their final product. Specifics will be instructed. Email me ppt files for feedback at least a day before the final presentation. Your final paper (& final version ppt)/ **is due by May 11 (to be emailed by noon**). **No late assignment will be accepted**.

- ***The length of final paper: min. 2,500 words up to 4000 words (excluding tables and figures) with references (min. 20 references)***

**COURSE POLICY AND EXPECTATIONS**: Class attendance is strongly recommended. Be punctual. Lateness is disruptive and disrespectful to your peers and to me. There will be a strong emphasis on active and effective **participation** in class discussions, not only during the class presentations and discussion periods following these presentations but also throughout all the other class periods. I expect each of you to be present and prepared for each class. This will involve having read the assigned material before each class. I strongly recommend not using your cell phones during class. *Academic dishonesty* will not be tolerated (honor code responsibilities). *Minor changes in course organization and content* may be required throughout the semester, thus students will be made aware and asked for input if such actions are needed. **Late assignments will not be accepted**.

**CLASS E-MAIL AND COMMUNICATION WITH ME:**
I will frequently e-mail to remind you of deadlines or to clarify points from a lecture. In addition, all class activities are facilitated by email**,** so please use GMU e-mail (**@gmu.edu) to facilitate any communication, questions, and discussion. Please check your e-mail and Blackboard announcement page **daily**. When you email your assignments be sure to label your file with your first name, date, and course number (e.g., Firstname0205-425). If you email a question of general interest, I will likely send my response to the entire class list via BB. Be sure to take full advantage of your classmates, the library, and the web as learning resources. Finding answers and solutions among yourselves by tapping into the multitude of resources available to you is generally a more gratifying and educationally valuable approach than seeking answers from a single authority.

**LABS & FIELD TRIPS:** Students are required to participate in scheduled fieldwork and field trips and do lab assignments as necessary. Field (& lab) work and/or field trips are scheduled for **some Tuesdays 1:30 PM – 4:10 PM** and/or on-campus lab sessions (in Wetland Mesocosm Compound or DK 3006). The instructor will discuss the field trips before they occur. Additional work in any of the labs or fields should be arranged with Dr. Ahn as necessary for your class project. Limited laboratory space for your class project work, if needed, can be made available in Ahn Wetland Ecosystem Lab (3071 and 3079a David King Hall). For field trips/fieldwork, you may want to wear shoes that can get wet or soiled. Transportation will not be provided for local field trips, car-pooling is strongly recommended. The cost of food and your share of the transportation costs (i.e., gas) are at your own expense.

**Also needed for field trips may include a** field notebook (e.g., paper or electronic –phone, pads), a camera (or your smartphone that can take pictures and videos), a pencil, a calculator and/or just your smartphone with photo-taking capacity. Old clothes and boots/shoes for fieldwork, rain gear upon weather conditions

**LAB REPORT**

Field/lab sessions will require a written report with photos (if available) (**900~ <1200 words** limit with photos) that will be due by the next field/lab session. For each lab/field, specific instruction will be provided.

| **GRADING:** (**subject to minor changes**) | **% of Grade** |
|---|---|
| **Lecture** | **GRADING (**subject to minor changes) |
| Mid-term exam (closed book) (I) | **15** |
| Literature review and presentation (I/G) | **15** |
| Final Paper/Presentation (I/G) | **25** |
| Homework + Weekly BB discussion (I) | **15** |
| **Lab/Field** | |
| Lab/Fieldwork/participation (G) | **10** |
| Lab/Fieldwork/Field trip reports-method and data analysis (I/G) | **20** |
| **TOTAL POINTS** | **100** |

*I = Individual; **G = Group (3-4 people max. depending on the total number of students enrolled);

- Failure to meet deadlines for reading summaries, assignments, and project paper will result in losing 2pts per day in the final grade
- All Group work (G) requires that student names are spelled out with their responsibilities and contributions to the task (e.g., presentations and data collection). More specifics will be discussed
- Your course will be determined using the following straight scale: A+ (97-100), A (94-96), A- (90-93), B+(85-89), B (80-84), C (70-79), D (60- 69), F(<60)

**DISABILITY SERVICES** is committed to providing equitable access to learning opportunities for all students by upholding the laws that ensure equal treatment of people with disabilities. If you are seeking accommodations for this class, please first visit http://ds.gmu.edu/ for detailed information about the Disability Services registration process. Then please discuss your approved accommodations with me. Disability Services is located in Student Union Building I (SUB I), Suite 2500. Email:ods@gmu.edu | Phone: (703) 993-2474.

**ESP DEPARTMENT** an intentionally inclusive community promotes and maintains an equitable and just work and learning environment. We welcome and value individuals and their differences including race, economic status, gender expression and identity, sex, sexual orientation, ethnicity, national origin, first language, religion, age, and disability.

**ACADEMIC INTEGRITY** Mason is an Honor Code university; please see the Office for Academic Integrity for a full description of the code and the honor committee process. The principle of academic integrity is taken very seriously and violations are treated gravely. What does academic integrity mean in this course? Essentially this: when you are responsible for a task, you will perform that task. When you rely on someone else's work in an aspect of the performance of that task, you will give full credit in the proper, accepted form. Another aspect of academic integrity is the free play of ideas. Vigorous discussion and debate are encouraged in this course, with the firm expectation that all aspects of the class will be conducted with civility and respect for differing ideas, perspectives, and traditions. When in doubt (of any kind) please ask for guidance and clarification.

**COUNSELING AND PSYCHOLOGICAL SERVICES**

If you experience feelings of anxiety, panic, depression, sadness during the semester, Student Health Services and Counseling and Psychological Services Offices (703-993-2380) provides a range of resources to assist and support you. Students can call (703-993-2831) or walk-in during open hours to schedule an appointment to talk with a healthcare provider. If you or someone you know experiences a mental health crisis or emergency, seek help immediately. Call 911 for local emergency services, the National Suicide Prevention Lifeline (1-800-273-8255), or text the Crisis Text Line (741-741) anytime. Visit http://caps.gmu.edu for more information.

**SEXUAL HARASSMENT, SEXUAL MISCONDUCT, AND INTERPERSONAL VIOLENCE**

George Mason University is committed to providing a learning, living and working environment that is free from discrimination and a campus that is free of sexual misconduct and other acts of interpersonal violence in order to promote community well-being and student success. *Faculty members are required to report all disclosures of sexual assault, interpersonal violence, and stalking to Mason's Title IX Coordinator per university policy 1412. If you wish to speak with someone confidentially, please contact the Student Support and Advocacy Center (703-380-1434), Counseling and Psychological Services (703-993-2380), Student Health Services, or Mason's Title IX Coordinator (703-993-8730; cde@gmu.edu).*

| **Date** | **Topic** (subject to minor changes) |
|---|---|
| JAN 22 | Class orientation, OSCAR, RS, 4Ps (AHN website), Introduction, Groups |
| JAN 27 | Ecological Sustainability -History of Ecosystem Ecology & Ecosystem Services |
| JAN 29 | Ecological Sustainability - Biodiversity and Biocomplexity |
| FEB 3 | Ecological Sustainability – Nature-Based Solutions |
| FEB 5 | Soil vs. Dirt, The language of Dirt in our culture |
| FEB 10 | Soil ecology and its importance for food ecosystem |
| FEB 12 | Dirt Project -history and background, Soil properties, Dustbowl -History and background |
| **FEB 17** | Guest speaker (Mr. Kurt Moser)- Four Mile Run Conservatory |
| FEB 19 | Nature and properties of soil – overview, **Paper 1** |
| FEB 24 | Basic biogeochemistry and ecosystem ecology, soil properties, and soil carbon |
| FEB 26 | Wetland ecology and soil biogeochemistry, Hydric soils **Paper 2** |
| MAR 3 | Hydric soils and their characteristics |
| MAR 5 | Paper review and discussion, **Papers 3** |
| MAR 10-16 | **Spring break** |
| MAR 17 | SOP orientation and exercise, **Papers 4** |
| MAR 19 | Designing an experiment and communicating science (article writing 101) |
| MAR 24 | DK Lab SOPs for SOM and lab orientation |
| MAR 26 | **Mid-term exam** |
| **MAR 31** | Rita Peralta (guest ppt)- Arlington and Fairfax County Park Authority |
| APR 2 | Soil themes in pop culture – songs, **Paper 5** |
| APR 7 | A case study– Creating and restoring urban wetlands **Paper 6** |
| **APR 9** | Special guest lecture –Sean Gagnon |
| APR 14 | Data analysis and interpretation exercise |
| APR 16 | Urban stormwater pond restoration – **Paper 7** |
| APR 21 | Research writing, video/discussion, **Paper 8** |
| APR 23 | FIELD STUDY and final project discussion |
| APR 28 | Neighborhood ecology- accidental wetlands and stormwater management (field trip) |
| **APR 30** | Learning from real-world experiences – ES jobs and opportunities (special guest) |

MAY 3 FINAL FIELD STUDY PRESENTATION
MAY 5 FINAL FIELD STUDY PRESENTATION

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**MAY 11*** Final Paper Due (to be emailed **by noon**)

LAB/FIELDS

| **Date** | **Topics and activities** |
|---|---|
| JAN 21 | No class |
| FEB 4 | Lab Orientation (DK 3006) |
| FEB 11 | AhnWetland Mesocosm Compound-history and background for a local watershed FEB |
| FEB 18 | *Dirt- the Movie* (Discussion board assignment- a review in 600 words) |
| FEB 25 | Reading/Group work |
| MAR 4 | Wetland Mesocosm Compound -field methods for plants and soils |
| MAR 11 | **Spring break** |
| MAR 18 | Nix Color sensor and SOM SOPs -data collection protocol |
| MAR 25 | Field method and fieldwork- sampling and lab work |
| APR 1 | Individual/group work |
| APR 8 | Fieldwork – Data collection/Lab processing |
| APR 15 | WSSI visit (Green Building and Rooftop wetland tour) |
| APR 19 | Data analysis (Group/Individual work) |
| APR 22 | US Botanic Garden visit |
| APR 29 | Project discussion |
| May 6 | Presentation prep/Individual work |

**CLASS RESEARCH PROJECT:** subject to minor changes

*Data Science meets Ecological Literacy of Soils as influenced by environmental changes –*
*"Soil color sensor data and soil organic matter along a gradient of urban flooding regime"*

**Review Papers and References for Research Project:**

1. Ahn C, Jones S. 2013. Assessing organic matter and organic carbon contents in soils of created mitigation wetlands in Virginia. Environ Eng Res 18(3):151-156. **Paper 2**
2. James I. McClintock . 1992. Gary Snyder's Poetry & Ecological Science, The American Biology Teacher, Vol. 54, No. 2 (Feb., 1992), pp. 80-83 **Paper 1**
3. Genthner, M. H., Daniels, W., Hodges, R. L., & Thomas, P. (1998). Redoximorphic Features and Seasonal Water Table Relations, Upper Coastal Plain, Virginia (pp. 43–60) **Paper 5**
4. He, X., Vepraskas, M., Lindbo, D., & Skaggs, R. (2003). A method to predict soil saturation frequency and duration from soil color. *Soil Science Society of America Journal*, *67*(3), 961–969 **Paper 6**
5. Swetha RK and Chakraborty (2021). Combination of soil texture with Nix color sensor can improve soil carbon prediction. *Geoderma 382 (114774).* **Paper 8**
6. Schmidt, S. A., & Ahn, C. (2019). A comparative review of methods of using soil colors and their patterns for wetland ecology and management. *Communications in Soil Science and Plant Analysis*, *50*(11), 1293–1309 - **Paper 3**.
7. Schmidt S. and Ahn, C. 2021. Predicting forested wetland soil carbon using quantitative color sensor measurements in the region of northern Virginia, USA", *Journal of Environmental Management* 300, 15 December 2021, 113823 **Paper 7**

8. Schmidt S. and Ahn, C. 2021. Analysis of Soil Color Variables and their Relationship between Two Field-Based Methods and its Potential Application for Wetland Soils. *Science of the Total Environment* 783: 147005 - **Paper 4**
9. Stiglitz, R., Mikhailova, E., Post, C., Schlautman, M., & Sharp, J. (2016b). Teaching soil color determination using an inexpensive color sensor. *Natural Sciences Education*, *45*(1). **Paper 9**
10. Turk JK and Young RA. (2020) Field Conditions and the accuracy of visually determined Munsell soil color. *Soil Science Society of America Journal* 84:163-169. **Paper 10**

*References for Nature-Based Solutions will be discussed individually with each group for final papers, if relevant