

Course Change Request

New Course Proposal

Date Submitted: 10/22/18 11:00 am

Viewing: **EVPP 433 : Natural Science for Educators**

Last edit: 10/22/18 11:00 am

Changes proposed by: ykih

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

Yes

Requestor:

Name	Extension	Email
Alonso Aguirre	37590	aaguirr3@gmu.edu

Effective Term:

Spring 2019

Subject Code:

EVPP - Environmental Science & Policy

Course Number:

433

Bundled Courses:

Equivalent Courses:

Catalog Title:

Natural Science for Educators

Banner Title:

Natural Science for Educators

Will section titles vary by semester?

No

Credits:

3

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:

4

Default Grade Mode:

Undergraduate Regular

Recommended Prerequisite(s):

none

Recommended Corequisite(s):

none

Required Prerequisite(s) / Corequisite(s) (Updates only):

none

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):

Registrar's Office Use Only - Registration Restrictions:

Field(s) of Study:

Class(es):

Level(s):

Degree(s):

School(s):

In Workflow

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

Approval Path

1. 10/22/18 6:26 pm
A. Alonso Aguirre (aaguirr3):
Approved for ESP Chair

Catalog Description: This course provides hands-on science content targeted towards preservice elementary education students. From large-scale global climate drivers to local weather and watershed impacts, through lab activities students will experience connections between physical and natural earth systems presented in an active learning format designed to enhance science competence and confidence. Through experiments, discourse and discussion, field activities, service learning, big picture ideas and cross cutting connections in science and engineering are investigated. A major goal of this course is to move students from grade seekers to students who seek knowledge, are engaged learners and who reflect upon science content and share ideas and teaching strategies with peers and the K12 community.

Justification: This course increases STEM confidence and competence in these future elementary education teachers. It is well-documented in the literature that both in-service and preservice (undergrad) Elementary Education teachers typically are anxious about science and math. Thus, raising confidence through hands-on investigations and experiences is essential to building our K12 teacher workforce. A disturbing trend across Virginia (as shared by Anne Petersen, Ph.D. Science Coordinator, Virginia Department of Education), is that many elementary schools are not teaching science until 3 and 4th grade because there is no required VA Standard of Learning test. This course prepares students with essential natural and physical science content, as well as cross-curricular activities they can implement in future classrooms, building their STEM competence to inspire our next generation of scientists.

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

Learning Outcomes:

- articulate the empirical nature of science and how the natural and the physical sciences are intertwined;
- demonstrate that the earth is a dynamic planet and science principles learned here can be extended to the world at large in both formal class and informal educational settings.
- practice the basic skills of scientific inquiry in content areas including: ecosystems, classification, plant structure/function, properties of light, sound waves, energy, electromagnetic spectrum, Newton's Laws of force and motion, electricity, magnetism, mass, density, composition of the earth, rock cycle, atmospheric elements/events, Chesapeake Bay issues, solar system, properties of elements, properties of water, molecules, chemical reactions
- explore the relationship between science, technology, engineering and society and practice methods for constructive scientific discourse in the classroom.
- construct a website where you synthesize and reflect on the process of learning science from your observations, experiential learning adventures and classroom discoveries.
- discover new personal interests in scientific fields and understand where to seek additional knowledge or assistance on science topics.

Attach Syllabus [Syllabus EVPP433 Natural Science for Educators.pdf](#)

Additional Attachments

Staffing: Dr. Cinthia Smith

Relationship to Existing Programs: CEHD 'counts' this course as required hours for Elementary Education science certification, and sends students to us. Mary Slone O'Neill and Kerri Marianos, who advise the Elementary Education students from CEHD, routinely send students to us.

Relationship to Existing Courses: CEHD 'counts' this course as required hours for Elementary Education science certification, and sends students to us. Mary Slone O'Neill and Kerri Marianos, who advise the Elementary Education students from CEHD, routinely send students to us.

Additional Comments: Instructed three times at ESP with the course number EVPP 490 and with great enrollment successes

Reviewer Comments

EVPP 490 Natural Science for Educators Spring 2018
Science Content for Pre-service Educators 4 credits

Monday & Wednesday 10:30am – 1:15pm Innovation Hall rm 215G

Professors: Cindy Smith, Ph.D
Offices: David King Hall, rm 3023
E-mail: csmitc@gmu.edu
Office Hours: MW 9:30am-10:30, after class or by appointment

Sherri Kohr, MS
703-217-1025
sherri.kohr@gmail.com

Required Readings for Science Content Learning & Fees

- E-book, composed of journal articles, SciPaks and videos extracted from the National Science Teachers Association (NSTA) Learning Center:
Class landing page: <http://learningcenter.nsta.org/gmu-evpp490-sp18>
- National Research Council (2012). [A Framework for K-12 Science Education: Practices, Crosscutting Concepts, and Core Ideas](#), the National Academies Press, Washington D.C.
- Zyke, D. (2001). Dinah Zyke's Big Book of Science for Middle School and High School. Dinah-Might Adventures.

Course Description and Objectives

This course provides hands-on science content targeted towards preservice elementary educators. From large-scale global climate drivers to local weather and watershed impacts, through lab activities students will experience connections between physical and natural earth systems presented in an active learning format designed to enhance science competence and confidence. Through experiments, discourse and discussion, field activities, service and experiential learning, big picture ideas and cross cutting connections in science will be investigated. A major goal of this course is to move students from grade seekers to students who seek knowledge, are engaged learners and who reflect upon science content and share ideas and teaching strategies with peers and K12 community. Cross cutting connections within science content areas will be continually mapped and illustrated. Early childhood & elementary education students will receive 4 credits of natural science toward their concentration requirements.

Class Format

In addition to laboratory exercises, science content material will be presented in an interactive format integrated with video clips, games, identifying and dispelling science misconceptions, critical thinking tasks, group work and construction of learning tools and personal reflection. Guest presenters and campus field trips to scientific laboratories will be included. A portion of the service learning activities will be attended by students outside of designated class time. Readings are collated into an online collection in each students' National Science Teacher Association library <http://learningcenter.nsta.org/>

By the end of this course you will:

- articulate the empirical nature of science and how the natural and the physical sciences are intertwined;
- demonstrate that the earth is a dynamic planet and science principles learned here can be extended to the world at large in both formal class and informal educational settings.
- practice the basic skills of scientific inquiry in content areas including: ecosystems, classification, plant structure/function, properties of light, sound waves, energy, electromagnetic spectrum, Newton's Laws of force and motion, electricity, magnetism, mass, density, composition of the earth, rock cycle, atmospheric elements/events, Chesapeake Bay issues, solar system, properties of elements, properties of water, molecules, chemical reactions
- explore the relationship between science, technology, engineering and society and practice methods for constructive scientific discourse in the classroom.
- construct a website where you synthesize and reflect on the process of learning science from your observations, experiential learning adventures and classroom discoveries.
- discover new personal interests in scientific fields and understand where to seek additional knowledge or assistance on science topics.

Policies

Attendance and participation

Class preparation and participation are **extremely important** to this interactive, experiential course. In class engagement points account for 10% of your final grade. Please come to class prepared to contribute to the exchange of ideas and information. Except for a medical reason or other emergency, in-class quizzes, labs, assignments and other work, cannot be made up. If there are extenuating circumstances, let us know well in advance. Engagement points will be lost for students arriving late or leaving early. Assignments requiring documentation images are considered complete only with the required photo(s).

Late work

Late work will not be accepted after one week. Work is due at the beginning of class, or stated Blackboard deadline (i.e. vocabulary, homework, etc...) will be marked off by 10% if a student is late to class.

Group Interaction

During class time, small learning groups will discuss concepts and reflect on laboratory activities. Your main points and questions will be shared with the class. Your engagement in the inquiry process, enthusiasm, and comments will contribute to your group project and participation grades.

Common Courtesy & Technology Use

Please do not be late for class after returning from breaks. Please turn off cell phones during class, unless indicated for use. Be sure to respectfully allow all students a turn to talk, in class or in small groups. Laptops are welcomed for taking notes, however use of laptops or phones for unrelated activities (i.e. texting, social media, email, tweets, online games etc...) indicates a lack of respect and value for your own learning. Points may be deducted from your daily participation grade for this activity. For assistance with Blackboard (i.e. uploading assignments) please contact <http://coursessupport.gmu.edu>

Unlimited Extra Credit

Documented experiments conducted outside of class will earn extra credit. **'Doing science' is by far, the best way to learn.** The format for documenting your questions and experimental processes is listed on BlackBoard. You may conduct an unlimited amount of out-of-class experiments for extra credit.

Grading

Grading

ASSIGNMENTS	POINTS
In Class Work & Participation	90
Five 10 point Homeworks based on readings	50
Three 35 point SciPaks -	105
Newton's Law Group Project	35
Chemical Reaction Group Project	45
Three 20 point Vocabulary	60
Three 20 point Graphic Organizers	60
One 20 point Group Discovery Projects	20
Wix Service Learning Website Peer Review of site	35
Non-Traditional School Service Learning Reflection	60
Judging STEM event Service Learning Reflection	60
Outdoor/Environmental Service Learning Reflection	60
Museum or Event Experiential Learning Reflection	60
Final Course Reflection	60
Final Wix Website -	100
TOTAL POINTS	900

828-900	A
810-827	A-
792-809	B+
738-791	B
720-737	B-
702-719	C+
648-701	C
630-647	C-
612-629	D+

Science Content Learning Tools:

Homework & Reading Assignments

Students should come to class with homework, and be prepared to discuss the assigned readings, activities and experiments conducted out of class. You will be required to complete five, 10-point assignments, over the course of the semester.

SciPaks

Students complete three (3) SciPaks from the NSTA Learning Center, these are 10 hour online self-paced learning experiences that contain readings, simulations, assessments on the content you will teach. SciPaks are aligned with the national science education standards, explain real-world phenomena, and offer K12 student misconceptions to watch out for and practical ideas for addressing them in future classrooms. If you choose to do any additional SciPaks, you may earn 45 extra credit points.

Graphic Organizers (foldables)

Students will construct three different graphic organizers, one in each content area.

Group Projects/Experiments

In addition to weekly laboratories, groups will present in-class demonstrations and investigations based on detailed scenarios posted on Blackboard (Chemistry demo, Newton's Laws)

Service Learning Wix Website -

You will create a wix website to showcase and synthesize your learning in this course. Specifically, you will document your experiential learning in four environments through the creation of visual essays. You will visually tell an engaging cohesive, reflective story of your experiences, supported by evidence, and synthesize these experiences with classroom activities. <http://www.wix.com/>.

Your Final Service Learning Websites must be constructed, saved, published and links submitted by: **10:30am Wednesday May 9, 2018**. Students who fail to publish their website or have a broken link will not receive credit. Please test link before submitting.

Vocabulary Lists

Three lists of vocabulary words based on the science concepts will be submitted. Each word will be accompanied by a **hand-written definition**, written in your own words and illustrated with a small original sketch which is **carefully labeled**. Each of the three assignments will vary slightly and be explained on Blackboard. To enhance learning, printed images are not allowed

Quizzes

Quizzes may be given on blackboard, at the beginning or end of periodic class sessions to assess synthesis of science content readings/videos and discussions.

Synthesizing Your Learning – Your Service Learning Wix Website will contain 6 sections (6 Tabs):

- **About Me (1 Tab)**
- **Service Learning (SL) posted on Wix Website (4 different tabs)**
 - Out of class Service Learning accounts for almost 25% your course grade, thus students are required to participate in 25 hours of EL outside of class. This supports your own personal science content learning. Students must visit at least **four different science learning environments, including one SL program from each of the environments listed below**. Photo documentation is required for all SL opportunities. Students will post a detailed reflective visual essay for each of the learning environment experiences. Students visiting more than one program in the same environment, can combine these experiences into a final visual essay for that SL category. Additional guidelines and specific locations to choose from will be posted on Blackboard.
- **Final Course Reflection - posted on Wix Website (1 Tab)**
 - In your final course reflection, which will be posted on your wix website, you will discuss the effectiveness of the various learning tools and presentation styles, service learning environments. Directions detailing the components of the final reflective essay will be posted on Blackboard.

Service Learning Environments:

1. Instructor led OUTDOOR Environmental Science experience:

Students will attend one OUTDOOR expert or naturalist led program. **There must be a guide present leading a program**. Students are highly encouraged to call ahead and to schedule this experience as soon as possible to ensure space is available.

2. Museum or Event Science experience:

Students will visit a museum or event targeted towards engaging children in science. You must attend a scheduled program presented by an educator where a school-aged audience is present. Students are highly encouraged to call ahead and to schedule this experience as soon as possible.

3. Non-traditional School Science experience:

Students may visit approved sites and present science lessons to young learners. Mason students will sign up for these opportunities directly with the preschool. Other teaching opportunities may be added. The Center is located at 4402 University Dr. next to the water tower and Rappahannock Parking Deck.

4. Science Event Judging experience

During class, all students will receive training in effective science event judging. Skills acquired from this training will be used to support community programs as an official judge. Service Learning opportunities will be and continually updated posted on Blackboard.

GMU Writing Center

Want to improve your writing skills? The GMU Writing Center is a terrific resource <http://writingcenter.gmu.edu>

Disability Accommodations Statement

If you have a documented learning disability or other condition that may affect academic performance you should: 1) make sure this documentation is on file with Disability Services (SUB I, Rm. 4205; 993-2474; <http://ds.gmu.edu>) to determine the accommodations you need; and 2) talk with professors to discuss your accommodation needs at the beginning of the semester

Honor Policy

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. <http://oai.gmu.edu/the-mason-honor-code-2/>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 aspect sof 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.