AEE 5054: STEM Integration in Agricultural Education
Spring, 2017

Course Description

Contemporary methods, strategies, and justification for incorporation of science, technology, engineering and mathematics (STEM) concepts and practices into secondary and non-formal agricultural education programs. Use of best practices for STEM teaching and learning and enhancement of STEM content in existing agriculture programs. (3H, 3C)

Prerequisite: Graduate standing (Degree-seeking or Commonwealth status). Professional experience in agricultural education highly recommended.

Schedule and Use of Modules

The course will consist of weekly modules delivered online through the *Pages tool* on Canvas (Virginia Tech's new online course management system). All course activities and assignments will be communicated through the module structure. Students are expected to read and complete all activities contained in the modules in the order they are presented. This is an asynchronous course, so students may work through the modules on their own schedule throughout the week. Modules and associated weekly assignments must be completed by ***9 am on Tuesdays***.
Course Dates: Jan. 17 – May 10

Instructor

Hannah H. Scherer: hscherer@vt.edu (540) 231-1759

Modes of communication:

1. Virtual office hours will be held once a week using the Chat function on Canvas, with the option to start a video conference in Canvas if needed. We will determine day and time via a Doodle poll during the first week of the course.
2. The Discussions Tool on Canvas will be utilized to address questions about assignments and course material.
3. Students may contact the instructor directly via email or telephone with questions or concerns of a personal nature. You can expect a response within 24 hours.

Learning Objectives

Having successfully completed this course, you will be able to:

- Describe the nature and process of science and explain how it informs best practices for science teaching, including inquiry-based instruction.
- Evaluate, revise and create agriscience lesson/unit plans using an inquiry learning cycle approach.
- Identify current national and state science and math standards related to your curriculum.
- Design, conduct and communicate the results of a scientific investigation using a guided inquiry structure.
- Use a lab notebook format to document learning, research findings, and personal reflections.

- Compare and contrast scientific inquiry and the engineering design/ build/ test process.
- Illustrate how an engineering project can be used to develop student skills and teach agriculture content.
- Identify quantitative skills that are relevant in agriculture contexts and demonstrate how these skills can be integrated into existing curriculum.
- Evaluate the use of technology in an agricultural education program with respect to learning goals and technology standards.
- Summarize findings from scholarly publications and identify ways to apply the findings to your teaching practice.

Required eTextbook

NSTA Learning Center e-textbook (**$72 fee**, registration information provided in Week 1 on Canvas)

Additional Readings will be posted on Canvas

Grading

The modules and assignments in this course are intended to help you use current pedagogies to enhance the STEM content in your agriscience courses and programs. Most assignments are designed to help you with these efforts and so that you come away from the course with material that you can use in your work. You will receive grades and feedback from me on your assignments within a week of submission. Grades will be based on the following criteria:

Item	Points
Weekly Assignments: 14 x 8 pts ea	112
Weekly Discussion Participation: 14 x 2 pts ea	28
Major Project	100
Final Presentation	10
Total	**250 points**

A	94% - 100%	235 - 250 pts	C+	77% - 79%	192.5 - 199.9 pts
A-	90% - 93%	225 - 234.9 pts	C	73% - 76%	182.5 - 192.4 pts
B+	87% - 89%	217.5 - 224.9 pts	C-	70% - 72%	175 - 182.5 pts
B	83% - 86%	207.5 - 217.4 pts	D	60% - 69%	150 - 174.9 pts
B-	80% - 82%	200 - 207.4 pts	F	0% - 59%	0 - 149.9 pts

Late Work. Your success in this course depends on completing all work (including discussion participation) in a timely manner. ***Late work will not be accepted without prior arrangements*** and will earn zero points. I am happy to make accommodations for extenuating circumstances, but it is your responsibility to contact me (via phone or email) *before the due date* to arrange a new deadline.

Weekly Assignments. Weekly assignments will be associated with each instructional module on Canvas. The intent of these activities is to help you engage with and reflect on the material in the module. They will range from doing an inquiry lab at home to writing or revising lesson plans. Detailed instructions for each assignment will be posted in the weekly modules on Canvas and will typically be turned in using the Assignments tab. Weekly assignments will be due by ***9 am on Tuesdays.***

Weekly Discussion Participation. You will use the discussion tool in Canvas and an online collaboration tool called Voicethread extensively in this course to interact with your classmates in the online environment. I will post a weekly prompt to guide the discussion, but it will be up to you to make substantive comments in a timely manner. Detailed expectations and a scoring rubric for forum participation are provided in the page for Week 1 on Canvas.

Major Project. This semester, you will have the opportunity to design your own major course project. It will draw on information you learn throughout the semester and give you a chance to apply it to your own professional/ educational context. Suggestions include: a literature review/ research paper, conducting an agriscience research project, developing and evaluating an educational program, or writing new STEM curriculum. Further information for developing your idea will be posted on Canvas.

Accommodations for Students with Disabilities
Reasonable accommodations are available for students who have a disability. Students should contact the Services for Students with Disabilities (SSD), 150 Henderson Hall, 231-3788 (V), 231-1740 (TTY); Susan P. Angle, spangle@vt.edu, www.ssd.vt.edu. "Students with disabilities are responsible for self-identification. To be eligible for services, documentation of the disability from a qualified professional must be presented to SSD upon request. Academic adjustments may include, but are not limited to: priority registration, auxiliary aids, program and course adjustment, exam modifications, oral or sign language interpreters, cassette taping of text/materials, notetakers/readers, or assistive technology."

Honor Code Statement
The Graduate Honor Code will be strictly enforced in this course. All assignments submitted shall be considered graded work, unless otherwise noted. All aspects of your coursework are covered by the Graduate Honor System. Any suspected violations of the Graduate Honor Code will be promptly reported to the Graduate Honor System. According to the Constitution of the Graduate Honor System at Virginia Tech, "The fundamental beliefs of the Graduate Honor Code are: (1) To trust in a person is a positive force in making that person worthy of trust, (2) To study, perform research and teach in an environment that is free from the inconveniences and injustices caused by any form of intellectual dishonesty is the right of every graduate student, and (3) To live by and Honor System, which places a positive emphasis on honesty as a means of protecting this right, is consistent with, and a contribution to, the University's quest for truth." (see http://ghs.graduateschool.vt.edu)

Communication Guidelines and Netiquette

If you have a question about the course content or assignments, please post your question as a new thread on the forum. Other students may have the same question. If you know the answer to one of these questions, you can add that to the discussion thread. Students are a great resource and can be very helpful in the class. If you have general questions about the set-up of the course or course policies, you should also post these to the forum. I will check the forum for questions at least once every 48 hours.

If you have a personal issue such as illness, difficulties with deadlines, etc., please send me an email (hscherer@vt.edu). I will respond to email at least once every 24 hours.

When communicating on the discussion forum or via email please keep in mind that this is a graduate level course. You should use a professional tone in all of your communications. Please follow the guidelines below:

- Use common courtesy and good manners.
- Use proper grammar, sentence structure, and correct spelling.
- Be clear and concise. Explain your ideas entirely but get quickly to the point.
- Using all capitals is the equivalent of SHOUTING and is considered RUDE.
- Avoid attacking someone for his or her point of view. Remember that many readers, including the instructor, will read it.
- Read over what you are going to send at least once, just as you would proof-read a paper you submit. Remember, once you submit your work, discussion, or email, you cannot change what you have written.
- It is not acceptable for you to present work or ideas of others as your own. If you quote from a source, use quotation marks and provide the original author's name and the work from which the quotation is taken. Use your own understanding of the work, instead of direct quotations if possible, and give credit to the original author by citing name and source of idea.
- Do not use acronyms such as ROFL (rolling on the floor laughing) as they are too informal for this course. You may use anatomical acronyms such as HR (heart rate), but please define them the first time you use them.

Technical Support Information

Virginia Tech has a 4Help helpdesk, operated by University Computing Support. It provides second level support during regular business hours (8:00 a.m. - 5:00 p.m., Monday - Friday) for assistance with a wide variety of computer problems. Moreover, you can find answers to many of your questions by reading the Knowledge Base.

Technical Requirements

The materials on this site require that the user have access to a computer that meets the specifications described here.

System

- Operating System
    - Windows 2000, Windows XP, or Vista *or*

    - Mac OS 10.3 or greater
- Browser
    - **Internet Explorer** 11 and Edge
    - **Chrome** 46 and 47
    - **Safari** 8 and 9
    - **Firefox** 42 and 43 (Extended Releases are not supported)
- 56 kbps or faster Internet connection
- 350+ MHz processor
- 256+ MB memory
- 1024x768 (1152x864 recommended) 16-bit color display or better

Productivity Software

- Microsoft Office
- Microsoft Office Compatibility Pack for Word, Excel, and PowerPoint 2007 File Formats. Please use this link to download this compatibility pack if you do not have the latest version of MS Office: Download Microsoft Compatibilty Pack

Plug-ins/Viewers

- Java Plug-in:
    - **Windows users only:** Java Plug-in, J2SE Runtime Environment (JRE) 1.5.0_03 or higher (also known as JRE 5.0).
    - **Java Plug-in for Mac OS X** comes with the plug-in you need.
- **Flash** 17 and 18 (used for recording or viewing audio/video and uploading files)
- Acrobat Reader 7.0 or higher
- Quicktime (any version)

Student Skills. You should be comfortable using Microsoft Word and PowerPoint. Additionally, you should be able to install any software or browser plugins required above. If you are a quick study, you can use Virginia Tech's access to Lynda.com to bone up on any technical skills you lack.

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Useful Canvas Resources

To help you get familiar with Canvas, the Learning Management System used in this course, please refer to the following resources:

- Getting started with Canvas:
- https://vt4help.service-now.com/ess/kb_view_customer.do?sysparm_article=KB0010590
- Canvas student guide: http://guides.instructure.com/m/4212
- Getting help with Canvas:
- https://vt4help.service-now.com/kb_view_customer.do?sysparm_article=KB0010623

More Academic and Student Support

You can learn about the wealth of academic and support services available to our students by visiting the pages on the VTOnline site that deal with services for students. You'll find an academic guide, student conduct, time management for e-learners, communication and writing in an online environment, study skills, academic and student life resources and links to technical help. Please take some time to browse the site and become familiar with these resources.

- Student Resources http://www.vto.vt.edu/?view=resources&show=resources

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Module	Start	End	Module Topic
1	Jan 17	Jan 24	Introduction to the STEM Education Movement
2	Jan 24	Jan 31	Relevance of STEM to Agricultural Education
3	Jan 31	Feb 7	Nature of science and research design
4	Feb 7	Feb 14	Implementing inquiry-based instruction
5	Feb 14	Feb 21	Science and agriculture – opportunities and challenges
6	Feb 21	Feb 28	Engineering design/ build projects
7	Feb 28	Mar 14	Problem-based learning (*includes Spring Break)*
8	Mar 14	Mar 21	Planning for problem-based learning
9	Mar 21	Mar 28	Contextual motivation for quantitative skills
10	Mar 28	Apr 4	Strategies for building quantitative skills in Ag Ed
11	Apr 4	Apr 11	Technology standards
12	Apr 11	Apr 18	Technology in the classroom
13	Apr 18	Apr 25	Models for STEM education
14	Apr 25	May 10	Final projects – peer review and submission