

Term Information

Effective Term Spring 2023

General Information

Course Bulletin Listing/Subject Area Agricultural Systems Mgmt
Fiscal Unit/Academic Org Food, Agric & Biological Eng - D1123
College/Academic Group Food, Agric & Environ Science
Level/Career Undergraduate
Course Number/Catalog 3585
Course Title Digital Agriculture
Transcript Abbreviation DigitalAg
Course Description Digital Agriculture provides an introduction and overview of the data driven processes, digital analytics and visualization, utilization of large data sets (crop, animal, weather, environment, capital assets) coupled with artificial intelligence to produce actionable information to enhance the profitability and sustainability of production agriculture.
Semester Credit Hours/Units Fixed: 3

Offering Information

Length Of Course 14 Week, 12 Week
Flexibly Scheduled Course Never
Does any section of this course have a distance education component? No
Grading Basis Letter Grade
Repeatable No
Course Components Lecture
Grade Roster Component Lecture
Credit Available by Exam No
Admission Condition Course No
Off Campus Never
Campus of Offering Columbus, Lima, Mansfield, Marion, Newark, Wooster

Prerequisites and Exclusions

Prerequisites/Corequisites HCS 2260 or ANIMSCI 2260 or AEDECON 2005 or STAT 1450; or permission of instructor.
Exclusions Not open to students with credit for 2580 or HCS 3585
Electronically Enforced Yes

Cross-Listings

Cross-Listings Cross-listed in HCS

Subject/CIP Code

Subject/CIP Code 01.0301
Subsidy Level Baccalaureate Course
Intended Rank Sophomore, Junior, Senior

Requirement/Elective Designation

Sustainability

The course is an elective (for this or other units) or is a service course for other units

Course Details

Course goals or learning objectives/outcomes

- Understand the evolution of principles, theories, and methods of data-driven agriculture effects on sustainability and society.
- Gain experience with modern knowledge-based production technologies.
- Understand data-driven insights, meaningful interpretation of results, and effective ways to visualize and communicate the outcomes to the sustainable management of agriculture inputs, to the workforce and society.
- Understand the economic and environmental benefits of data driven agriculture for the producer, consumer, and society.
- Understand how data generated by different technologies/farm operations on the farm is collected, analyzed producing results that are being used in Enterprise Agriculture to make farm operations efficient and sustainable.

Content Topic List

- Introduction to Digital Agriculture
- Global Navigation Satellite Systems
- Geographic Information Systems and Coordinate Conversions
- Farm Management Information Systems
- Variable Rate Technology and its application in sustainable agriculture.
- Soil Sampling and Sensing
- Yield Monitoring in digital agriculture
- Yield Mapping in digital agriculture and its application in variable rate applications
- Artificial Intelligence Basics
- Artificial Intelligence in Crop Care
- Controller Area Networks and Decoding CAN Signals
- Data, Ownership, Ethics, Security, Computing & Storage
- Google Earth and its application in digital agriculture
- Remote Sensing and its application in digital agriculture
- Drones, Small Unmanned Aerial Systems, and their application in digital agriculture
- Precision Conservation Management
- Controlled Environment Production
- Weather Data and its application in digital agriculture
- Precision Irrigation and Drainage
- Crop and Animal Modeling
- Precision Livestock Farming
- Pasture Based Livestock Production
- On-Farm Research and its role in digital agriculture.
- Data Analytics and Visualization of digital agriculture data, and their application to decision making
- Internet of Things (IoT) and their application in digital agriculture
- AI in Marketing and Agricultural Supply Chain Logistics.
- Blockchain and Cryptocurrencies
- Enterprise Agriculture

Sought Concurrence

Yes

Attachments

- AGSYSMT 3585 GE justification Final_20211130.pdf: GE Justification
(GEC Model Curriculum Compliance Stmt. Owner: Trefz, Kelvin Eugene)
- AGSYSMT_HCS_3585_3586_Concurrency_request.pdf: List of Depts Concurrency
(List of Depts Concurrency Requested From. Owner: Trefz, Kelvin Eugene)
- Course_Review_Concurrency_Form_3585_20211210.pdf: Concurrere form
(Concurrency. Owner: Trefz, Kelvin Eugene)
- Course_Review_Concurrency_Animal_Sciences_AGSYSMT_HCS_3585_20211210.pdf: Animal Sciences 3585
(Concurrency. Owner: Trefz, Kelvin Eugene)
- Course_Review_Concurrency_Animal_Sciences_AGSYSMT_HCS_3586_20211210.pdf: Animal Sciences 3586
(Concurrency. Owner: Trefz, Kelvin Eugene)
- Course_Review_Concurrency_Civil_Environmental_Geodetic_Engineering_AGSYSMT_HCS_3585_and_3586.pdf: CECE 3585 and 3586
(Concurrency. Owner: Trefz, Kelvin Eugene)
- Course_Review_Concurrency_Geography_AGSYSMT_HCS_3585_and_3586.pdf: Geography 3585 and 3586
(Concurrency. Owner: Trefz, Kelvin Eugene)
- Course_Review_Concurrency_Knowlton_Schl_of_Architecture_AGSYSMT_HCS_3585_and_3586.pdf: Knowlton 3585 and 3586
(Concurrency. Owner: Trefz, Kelvin Eugene)
- Course_Review_Concurrency_SENR_AGSYSMT_HCS_3585_20211210.pdf: SENR 3585
(Concurrency. Owner: Trefz, Kelvin Eugene)
- Course_Review_Concurrency_SENR_AGSYSMT_HCS_3586_20211210.pdf: SENR 3586
(Concurrency. Owner: Trefz, Kelvin Eugene)
- AGSYSMT_HCS_3585_Interdisciplinary_Team-Taught_Inventory.pdf: Interdisciplinary Team
(Other Supporting Documentation. Owner: Trefz, Kelvin Eugene)
- AGSYSMT_HCS_3585__Syllabus_Final.docx: Syllabus 3585
(Syllabus. Owner: Trefz, Kelvin Eugene)

Comments

- Revise as per COAA via email message 7 February 2022

Revise as discussed on 27 January 2022

Revise as per discussion 19 January 2022

Revise as per discussion 6 January 2022 *(by Osborne, Jeanne Marie on 02/07/2022 04:29 PM)*

- 1. The 7 HW are now 6 and labeled 1-6
- 2. Concurrences are coming in, two are currently in (Knowlton and Geography).
- 3. I have uploaded a revised Syllabus to reflect the above changes.

Concurrences requested 01/12/22, as of 12/27/21:

Animal Sciences – Conkurs

AEDE (management, cryptocurrencies) – not received

SENR – Conkurs

Geography – Conkurs

College of Engineering including

Computer Science and Engineering (cloud computing). – not received

Civil, Environmental & Geodetic Engineering – Conkurs

Knowlton School of Architecture – Conkurs *(by Trefz, Kelvin Eugene on 01/12/2022 03:11 PM)*

- I have a few questions that need some clarification:
 - 1) Length of Course: Both 14 weeks and 12 weeks were selected. Is this because you plan to offer this course during spring, autumn, and summer?
 - 2) In your syllabus (under grading rubric), you mentioned that there are 7 HW assignments, but only 6 were listed (No. 1, 3, 4, 5, 6 & 7). Please double-check this. These assignment numbers were also referred to in the Inventory file.
 - 3) I saw the Concurrency Request email dated on Dec. 10 sent to other units. Have you received any response from them? *(by Chen, Qian on 12/20/2021 02:34 AM)*

COURSE REQUEST
3585 - Status: PENDING

Last Updated: Vankeerbergen, Bernadette
Chantal
04/08/2022

Workflow Information

| Status | User(s) | Date/Time | Step |
|--------------------|---|---------------------|------------------------|
| Submitted | Trefz, Kelvin Eugene | 12/10/2021 10:41 AM | Submitted for Approval |
| Revision Requested | Chen, Qian | 12/20/2021 02:34 AM | Unit Approval |
| Submitted | Trefz, Kelvin Eugene | 12/21/2021 09:59 AM | Submitted for Approval |
| Revision Requested | Chen, Qian | 12/23/2021 07:29 AM | Unit Approval |
| Submitted | Trefz, Kelvin Eugene | 12/27/2021 08:38 AM | Submitted for Approval |
| Approved | Chen, Qian | 12/28/2021 09:53 AM | Unit Approval |
| Revision Requested | Osborne, Jeanne Marie | 01/06/2022 02:17 PM | College Approval |
| Submitted | Trefz, Kelvin Eugene | 01/12/2022 03:28 PM | Submitted for Approval |
| Approved | Chen, Qian | 01/13/2022 01:09 AM | Unit Approval |
| Revision Requested | Osborne, Jeanne Marie | 01/19/2022 02:11 PM | College Approval |
| Submitted | Trefz, Kelvin Eugene | 01/24/2022 04:33 PM | Submitted for Approval |
| Approved | Chen, Qian | 01/25/2022 03:35 AM | Unit Approval |
| Revision Requested | Osborne, Jeanne Marie | 01/28/2022 10:27 AM | College Approval |
| Submitted | Trefz, Kelvin Eugene | 01/28/2022 10:44 AM | Submitted for Approval |
| Approved | Chen, Qian | 01/28/2022 12:05 PM | Unit Approval |
| Revision Requested | Osborne, Jeanne Marie | 02/07/2022 04:29 PM | College Approval |
| Submitted | Trefz, Kelvin Eugene | 02/10/2022 09:37 AM | Submitted for Approval |
| Approved | Chen, Qian | 02/10/2022 10:42 AM | Unit Approval |
| Approved | Osborne, Jeanne Marie | 02/11/2022 01:40 PM | College Approval |
| Pending Approval | Cody, Emily Kathryn Jenkins, Mary Ellen Bigler Hanlin, Deborah Kay Hilty, Michael Vankeerbergen, Bernadette Chantal Steele, Rachel Lea | 02/11/2022 01:40 PM | ASCCAO Approval |

Digital Agriculture Syllabus

AGSYSMT/HCS 3585 Spring 2023

Course Information

- **Course times and location:** MWF, 5:20 - 6:15 PM; location: TBD
- **Credit hours:** 3
- **Mode of delivery:** In Person

Instructors

Department of Food, Agricultural and Biological Engineering:

Name: Dr. Scott A. Shearer
Email: shearer.95@osu.edu (preferred)
Phone: 614-292-7284
Office location: 590 Woody Hayes Drive
Office hours: please contact Bethany Dickess (dickess.3@osu.edu) to set-up an appointment; use the course number (AGSYSMT/HCS 3585) in the subject line.

Name: TBD
Email:
Phone: 614-688-4944
Office location:
Office hours: TBD

Department of Horticulture and Crop Science:

Name: Dr. David Barker
Office location: 226 Kottman Hall
E-mail: barker.169@osu.edu (preferred)
Phone: (614) 247-6258
Office Hours: TBD

Name: Dr. Guilherme Signorini
Office location: 225 Howlett Hall
E-mail: signorini.2@osu.edu (preferred)
Phone: no phone
Office Hours: TBD

Name: Dr. Alex Lindsey
Office location: 312A Kottman Hall
E-mail: lindsey.227@osu.edu (preferred)
Phone: (614) 292-3864
Office Hours: TBD



Course Coordinator

Department of Horticulture and Crop Science:

Name: Dr. Ramarao Venkatesh

301 Kottman Hall

E-mail: venkatesh.1@osu.edu (preferred)

Phone: (614) 688-4204

Office Hours: TBD

Preferred contact method: First contact with any instructor should be at Ohio State email address. Student will receive a response within **24 hours**.

Class-wide communications will be sent through the Announcements tool in CarmenCanvas. Please check your [notification preferences](https://go.osu.edu/canvas-notifications) (go.osu.edu/canvas-notifications) to be sure you receive these messages.

Course Prerequisites

HCS 2260 or ANIMSCI 2260 or AEDECON 2005 or STAT 1450.

Course Exclusions

AGSYSMT 2580

Course Description

Digital Agriculture provides an introduction and overview of the data driven processes, digital analytics and visualization, utilization of large data sets (crop, animal, weather, environment, capital assets) coupled with artificial intelligence to produce actionable information to enhance the profitability and sustainability of production agriculture.

Digital Agriculture provides an overview of the emergence of data-driven processes and using it to make management decisions in agriculture. This advancement of digital tools and analytics seeks to combine large data sets and sources with crop, animal, weather, environment, and capital asset management models, coupled with artificial intelligence, to produce actionable information to enhance the profitability and sustainability of production agriculture. Simply stated, “digital agriculture” is the “generation and analysis of large data sets to produce actionable information.” This course seeks to provide perspective and a lexicon for students interested in learning more about the data-driven agriculture. Recent developments including cloud computing and the “Internet of Things” are reshaping nearly every facet of agricultural production (food, fiber, and energy), and processing and distribution of products downstream of the farm gate. It is first in a series of courses that will address the impact of data-driven management decisions on agricultural production, sustainability, and food security.



For data driven agriculture, sustainability is defined as the ability for producers to make a product that is efficient and profitable, that minimizes the impact to the land, air, and water, and that enhances the quality of life for local, national, and international communities.

General Education Goals and Expected Learning Outcomes

As part of the Sustainability Theme of the General Education curriculum, this course is designed with the following Goals and Expected Learning Outcomes:

GE Goal 1: Successful students will analyze sustainability at a more advanced and in-depth level than in the Foundations component.

Expected Learning Outcomes (ELO)

- ELO 1.1 Engage in critical and logical thinking about the topic or idea of sustainability.
- ELO 1.2 Engage in an advanced, in-depth, scholarly exploration of the topic or idea of sustainability.

GE Goal 2: Successful students will integrate approaches to sustainability by making connections to out-of- classroom experiences with academic knowledge or across disciplines and/or to work they have done in previous classes and that they anticipate doing in future.

Expected Learning Outcomes

- ELO 2.1 Identify, describe and synthesize approaches or experiences as they apply to sustainability.
- ELO 2.2 Demonstrate a developing sense of self as a learner through reflection, self-assessment and creative work, building on prior experiences to respond to new and challenging contexts.

GE Goal 3: Successful students will analyze and explain how social and natural systems function, interact, and evolve over time; how human well-being depends on these interactions; how actions have impacts on subsequent generations and societies globally; and how human values, behaviors and institutions impact multifaceted potential solutions across time.

Expected Learning Outcomes

- ELO 3.1 Describe elements of the fundamental dependence of humans on Earth and environmental systems, and on the resilience of these systems.

- ELO 3.2 Describe, analyze, and critique the roles and impacts of human activity and technology on both human society and the natural world, in the past, present and future.

ELO 3.3 Devise informed and meaningful responses to problems and arguments in the area of sustainability based on the interpretation of appropriate evidence and an explicit statement of values.

AGSYSMT/HCS 3585 course fulfills ALL of the Sustainability Theme Learning Goals and Expected Learning Outcome outcomes:

Students will engage in analyzing sustainability at a more advanced and in-depth level. Students will use integrated approaches to study sustainability by making connections between their out-of-classroom experiences, academic knowledge across disciplines, and past/future work. Students will analyze and explain

- a) how social and natural systems function, interact, and evolve over time;
- b) how human well-being depends on these interactions;
- c) how these actions have an impact on subsequent generations and societies globally; and
- d) how human values, behaviors, and institutions have an impact on multifaceted potential sustainability solutions across time.

This course fulfills the General Education learning objectives for the Sustainability Theme by:

- Engaging in critical and logical thinking about the topic of sustainability through a series of lectures, discussions, and writing (Homework, Guest Lecture Reflection, Technical Feasibility Study) with focus on sustainability via the data generated in Digital Agricultural, environment, local and global society, and effects of data driven decisions on humans and human interaction to the proposed changes.
- Engaging in a semester-long in-depth and advanced scholarly exploration of sustainability in the Technical Feasibility Study and some of the Homeworks.
- Analyzing, cleaning, and providing visualization for the data sets to communicate the results to individuals, groups (local or global communities) to make informed decisions to create a more sustainable future.
- Throughout the semester students will submit written reflections on the guest lectures, descriptions of their work and the view of the next “ten years”. Additional writings about the sources of data, thought leaders, current trends, and the future of digital agriculture will help develop the student’s sense of self as learner, individual, member of society and improve their ability to interact with other students and persons outside of their academic life.
- The lecture topics provide descriptions of the interactions of human activity, technology, and societal norms in relation to the environment and the sustainability of those interactions

based on the data. The delicate balance of needs and desires of a growing population, the ability of nature to support those needs and desires along with the knowledge of how to gather and analyze data allows students to make informed decisions.

When this 3-credit AGSYSMT/HCS 3585 lecture is taken in combination with the 1-credit AGSYSMT/HCS 3586 laboratory, together these 4-credits (i.e., 3-credit lecture + 1-credit laboratory) fulfill ALL Goals and ALL Expected Learning Outcomes for the Sustainability Theme category.

When AGSYSMT/HCS 3585 is taken in combination with the 1-credit AGSYSMT/HCS 3586, “Digital Agriculture Laboratory”, these courses meet the expectations of the integrative, interdisciplinary, team-taught practice. The subject matter encompasses, biological, engineering, economic and social scales that are too broad or complex to be dealt with adequately by a single discipline or profession.

This course is taught by a multi-disciplinary team comprising of six faculty from two departments (Food, Agricultural and Biological Engineering, and Horticulture and Crop Science) in the College of Food, Agricultural, and Environmental Sciences (CFAES). Complex topics like managing global nitrogen cycle, climate change/extreme weather impacts, environmental impact, food security/safety/traceability, sustainability, carbon sequestration, viability of rural communities (profit, labor), water quality and quantity issues, provide students opportunities to interact with each other, with instructors, and guest speakers.

Students will work with large scale complex problems throughout the entire course centered on food system operations (small holder vs corporate) that have an impact on the profitability, environment, sustainability, how technology impacts food, fuel, fiber, energy production practices, logistics, and careers (current and future). Students will have opportunities to revisit, analyze, and synthesize the material taught in the course. Students can compare their knowledge and understand the complex issues of data driven food, fuel, and fiber production systems and chart how their knowledge and understanding has changed across time. The content and procedures learned in this course will not only provide the basis for completing class assignments and activities but can be applied to future courses and employment.

Note: AGSYSMT/HCS 3586 (1 hr.) cannot be taken alone, nor fulfill GE credit without AGSYSMT/HCS 3585.

Course Goals and Course Learning Outcomes (CLO)

By the end of this course, students should successfully be able to:

Course Goal 1. Understand the evolution of principles, theories, and methods of data-driven agriculture effects on sustainability and society.

CLO 1.1 *Apply* the definitions, principles, theories, methods, history, and development of data driven agriculture.

CLO 1.2 *Evaluate* the use and role of different technologies in data driven agriculture, and food systems that affect sustainability, environment, and society.

Course Goal 2. Gain experience with modern knowledge-based production technologies.

CLO 2.1 *Compare* the technologies used in data driven agriculture and food systems as they effect sustainability, environment, and society.

CLO 2.2 *Compare* the precision farming technologies used in intelligent networks and in data management (Ownership, Privacy, Ethics, Security).

CLO 2.3 *Make use of* geospatial technologies, intelligent networks, RFID, blockchain, data mining (Ethics, Computing, Storage), applied IoT, and artificial intelligence used in data driven agriculture with the sustainability, and effects on the environment and society.

CLO 2.4. *Explain* On-Farm Research plot design and protocols that influence sustainability, environment, and society.

CLO 2.5 *Analyze* the automation of agricultural and livestock production, processing, and distribution systems with the sustainability, and effects on the environment and society.

CLO 2.6 *Categorize* how and where Artificial Intelligence is being used in data driven agriculture to make profitable and sustainable farm operations and improve consumer experience.

Course Goal 3. Understand data-driven insights, meaningful interpretation of results, and effective ways to visualize and communicate the outcomes to the sustainable management of agriculture inputs, to the workforce and society

CLO 3.1 *Identify* data collection, data analysis, interpretation of results and effective communication of results to farmers/workforce and society that helps to plan their farm operations.

Course Goal 4. Understand the economic and environmental benefits of data driven agriculture for the producer, consumer, and society.

CLO 4.1 *Examine* how data driven agriculture allows farmers to have economic and environmental benefits from their operations and the influence this has on society.

Course Goal 5. Understand how data generated by different technologies/farm operations on the farm is collected, analyzed producing results that are being used in Enterprise Agriculture to make farm operations efficient and sustainable.

CLO 5.1 *Model* data flow and outputs in Enterprise Agriculture to their effects on the sustainability, environment, and society.

How This Course Works

Mode of delivery: In Person

Pace of activities:

This course is divided into **weekly modules** that are released one week ahead of time. Students are expected to keep pace with weekly deadlines but may schedule their efforts freely within that time frame.

Credit hours and work expectations: This is a 3 credit-hour multi-disciplinary team taught course. According to [Ohio State bylaws on instruction](http://go.osu.edu/credit%20hours) (go.osu.edu/credit hours), students should expect around 3 hours per week of time spent on direct instruction (instructor content and Carmen activities, for example) in addition to 6 hours of laboratory and homework activities (reading and assignment preparation, for example) to receive a grade of C average.

Please note: This includes studying, reviewing, and editing notes, discussing with fellow students, etc. and does not equate to assignments and homework activities.

Attendance and participation requirements:

Research shows regular participation is one of the highest predictors of success. With that in mind, the instructor has the following expectations for everyone's participation:

- **Attendance:** You are expected to attend all classes.
- **Participation:** Your participation in class is essential to your success. Participation includes Answering questions in class when called upon; sharing relevant insights of examples from your experiences; Asking questions if you do not understand the material
- In case of emergencies and other circumstances that prevent you from attending, please contact the instructor as soon as possible by email. Official documentation (e.g., from a doctor's office or hospital, or interviewer, etc.) must be provided. If you miss a lab session, please discuss how to make up the lab with the instructor in a different time.

Course Materials, Fees and Technologies

Required Materials and/or Technologies

- Precision Agriculture Basics. 2018. D. Kent Shannon, David E. Clay, and Newell R. Kitchen, (editors). Published by the American Society of Agronomy, Inc., Crop Science Society of America, Inc., Soil Science Society of America, Inc.
 - Purchase – [Precision Agriculture Basics](https://doi.org/10.2134/precisionagbasics). ISBN #: 978-0-89118-367-9 (online; doi:10.2134/precisionagbasics).

- Library – The Precision Agriculture Basics link goes to the OSU Libraries. You must login with your OSU username and password if you are not logged in. To view the book, click on the “Connect to resource ACSESS Digital Library” link. Scroll down under the Table of Contents click on “DOWNLOAD FULL BOOK” or you can go to a specific chapter and download just that chapter.
- The instructor will provide you with supplementary reading materials periodically and will be announced during the lecture. They will be uploaded to Canvas.
- Computer: current Mac (OS X or PC (Windows 10 or higher with high-speed internet connection
- Webcam: built-in or external webcam, fully installed and tested
- Microphone: built-in laptop or tablet mic or external microphone

Recommended/Optional Materials and/or Technologies

- Crawley, M.J. 2013. *The R Book*. John Wiley and Sons, Ltd.: Chinster, West Sussex, United Kingdom. 2nd Ed. ISBN #: 9780470973929.
- Fischer, M.M., and A. Getis. 2010. *Handbook of Applied Spatial Analysis; Software Tools, Methods and Applications*. Springer-Verlag Berlin Heidelberg; ISBN #: 978-3-642-03646-0.
- Marshall, D.M., et al. 2011. *Introduction to Unmanned Aircraft Systems*. CRC Press, Boca Raton, FL. ISBN #: 1439835209.
- Price, M.H. 2016. *Mastering ArcGIS*. McGraw Hill Education: New York, New York. 7th Ed. ISBN #: 007809514X.

Fees and/or Additional Requirements

- None

Required Equipment

- **Computer:** current Mac (MacOS or PC (Windows 10 with high-speed internet connection
- **Webcam:** built-in or external webcam, fully installed and tested
- **Microphone:** built-in laptop or tablet mic or external microphone
- **Other:** a mobile device (smartphone or tablet to use for BuckeyePass authentication

If you do not have access to the technology you need to succeed in this class, review options for technology and internet access at go.osu.edu/student-tech-access.

You can use any electronic device to access the course in CarmenCanvas and perform all of the function needed to complete the course. There may be additional directions or restrictions for some of the activities as noted in those activities.

Required Software

- **Microsoft Office 365:** All Ohio State University students are now eligible for free Microsoft Office 365 ProPlus through [Microsoft's Student Advantage program](#). Full instructions for downloading and installation is found [Office 365 - Installation of Office for Windows/Mac for Students](#).
- **Zotero:** You also need to install the ASABE style by going to [Zotero Style Repository](#) then select [American Society of Agricultural and Biological Engineers](#) or, [ZoteroBib](#) to build bibliography without downloading the app and style. Instructions are found [ZoteroBib FAQ](#).

CarmenCanvas Access

You will need to use [BuckeyePass](#) (buckeyepass.osu.edu multi-factor authentication to access your courses in Carmen. To ensure that you are able to connect to Carmen at all times, it is recommended that you do each of the following:

- Register multiple devices in case something happens to your primary device. Visit the [BuckeyePass - Adding a Device](#) (go.osu.edu/add-device help article for step-by-step instructions.
- Request passcodes to keep as a backup authentication option. When you see the Duo login screen on your computer, click **Enter a Passcode** and then click the **Text me new codes** button that appears. This will text you ten passcodes good for 365 days that can each be used once.
- [Install the Duo Mobile application](#) (go.osu.edu/install-duo on all of your registered devices for the ability to generate one-time codes in the event that you lose cell, data, or Wi-Fi service.

If none of these options will meet the needs of your situation, you can contact the IT Service Desk at [614-688-4357](tel:614-688-4357) ([HELP](#) and IT support staff will work out a solution with you).

Technology Skills Needed for This Course

- Basic computer and web-browsing skills
- [Navigating CarmenCanvas](#) (go.osu.edu/canvasstudent)
- [CarmenZoom virtual meetings](#) (go.osu.edu/zoom-meetings)
- [Recording a slide presentation with audio narration and recording, editing and uploading video](#) (go.osu.edu/video-assignment-guide)

Technology Support

For help with your password, university email, CarmenCanvas, or any other technology issues, questions, or requests, contact the IT Service Desk, which offers 24-hour support, seven days a week.

- **Self Service and Chat:** go.osu.edu/it

- **Phone:** [614-688-4357 \(HELP\)](tel:614-688-4357)
- **Email:** servicedesk@osu.edu

Grading and Faculty Response

How Your Grade is Calculated

| Assignment Category | Percentage |
|--|-------------|
| Homework (6) and Guest Lecture Reflections (4) | 10% |
| Weekly quizzes (6) | 10% |
| Technical Feasibility Study (1) | 20% |
| Exams (2) (20% each) | 40% |
| Final Exam (1) | 20% |
| Total | 100% |

See [Course Schedule](#) for due dates.

Descriptions of Major Course Assignments

Description: During the semester, you will complete various assignments (Homework, Guest Lecture Reflections), Quizzes, a Technical Feasibility Study, Exams, and Final Exam. Assignments may not be turned in after the due date (not counting excused absences). If an exception is not made, they will be penalized 20% for each day late. Persons with excused absences (verified illness, academic conflict) may in some cases be able to make up the material. In these cases, if it is not feasible to duplicate a missed assignment, the assignment will not be factored into the final grade. Specific course requirements are listed next. **See page 16 for the Late Assignment Policy.**

Grading Rubric for Homework (HWK)

Students will have homework to complete. Be sure you understand the specifics of the homework and respond accordingly. Homework will count for **10% of your final grade**. A total of six (6) Homework exercises will be given during the entire duration of the course.

We are training you to become professionals. With this in mind, your work should be of high quality. Your homework should be organized and meet the requirements mentioned in the following “general” rubric. But, for each **homework we will provide you with a specific rubric relevant to the assigned homework. Partial credit will be given.**

HWK No. 1: Agricultural Production System Description

The objective of this homework is to facilitate broader thinking when it comes to agricultural production systems, especially as each of these systems are being digitized. Students must recognize that with sensor densification and automation of the production systems, and there is a concomitant increase in the data that is being generated, curated, and aggregated. There are multiple benefits derived from analyses of these data that will accrue to the society extending well beyond the farm gate.

Goal 1 [CLO 1.1 (ELO 3.1, 3.2, 3.3); CLO 1.2 (ELO 1.1, 1.2, 2.1, 3.2)]

Goal 2 [CLO 2.1 (ELO 1.1, 2.1, 3.1, 3.2, 3.3); CLO 2.2 (ELO 1.1); CLO 2.3 (ELO 2.1, 3.2, 3.3); CLO 2.4 (ELO 1.2, 2.1); CLO 2.5 (ELO 1.2, 2.1, 3.1, 3.2, 3.3); CLO 2.6 (ELO 1.2, 3.2, 3.3, 3.3)]

Goal 3 [CLO 3.1 (ELO 1.1, 2.1, 3.1, 3.2, 3.3)]

Goal 4 [CLO 4.1 (ELO 1.2, 2.1, 3.1, 3.2, 3.3)]

HWK No. 2: Social Media As a “Knowledge Tool” For Precision Agriculture Goal 1, 2, 3,

The objective of this homework is to provide students with a perspective about using social media as a vehicle to collect information about digital agriculture and current ag tech. You can use any of the following social media platforms - Twitter, Facebook, or Instagram. The intent is for students to develop a list of thought leaders working in an area of interest to them, and then follow these thought leaders for the remainder of the semester to see what can be learned from their posts. This is one way to stay current professionally with forces affecting the marketplace and shifts arising from the introduction of technology.

Goal 1 [CLO 1.1 (ELO 3.1, 3.2, 3.3); CLO 1.2 (ELO 1.1, 1.2, 2.1, 3.2)]

Goal 2 [CLO 2.1 (ELO 1.1, 2.1, 3.1, 3.2, 3.3); CLO 2.2 (ELO 1.1); CLO 2.3 (ELO 2.1, 3.2, 3.3); CLO 2.4 (ELO 1.2, 2.1); CLO 2.5 (ELO 1.2, 2.1, 3.1, 3.2, 3.3); CLO 2.6 (ELO 1.2, 3.2, 3.3, 3.3)]

Goal 3 [CLO 3.1 (ELO 1.1, 2.1, 3.1, 3.2, 3.3)]

HWK No. 3: Conferences as a “Knowledge Tool” for Digital Agriculture Goal 1, 2, 3, 4

The objectives of this homework are to: 1) to make you aware of current research in digital agriculture, 2) help you to identify state-of-the-art and future technologies in digital agriculture, and 3) create a list of researchers and institutions where they work for your own use. The list might help you in the future should you want to continue your education by seeking advanced/graduate degree.

Goal 3 [CLO 3.1 (ELO 1.1, 2.1, 3.1, 3.2, 3.3)]

Goal 4 [CLO 4.1 (ELO 1.2, 2.1, 3.1, 3.2, 3.3)]

HWK No. 4: Data Interoperability in Digital Agriculture Goal

The objectives of this homework are to: 1) explain the need for interoperability between hardware and software applications and how AgGateway solved this issue, 2) illustrate the components and function of the Ag Data Application Programming Toolkit (ADAPT), and 3) summarize the case studies highlighting the benefits of adopting ADAPT.

Goal 3 [CLO 3.1 (ELO 1.1, 2.1, 3.1, 3.2, 3.3)]

Goal 4 [CLO 4.1 (ELO 1.2, 2.1, 3.1, 3.2, 3.3)]

Goal 5 [CLO 5.1 (ELO 1.1, 1.2, 2.1, 3.1, 3.2, 3.3)]

HWK No. 5: Google Earth

In this homework, you will explore Google Earth as a Digital Ag tool. The specific objectives of this homework are to: 1) learn about Google Earth, 2) import and extract information from KML files, and 3) generate a sample KML file.

Goal 2 [CLO 2.3 (ELO 2.1, 3.2, 3.3)]

HWK No. 6: Data Ownership Disclosure Agreements

In this homework, you will review a simple farm ground cash lease agreement. The objectives of this homework are to: 1) review the lease agreement provided; 2) evaluate the agreement by comparing it with AFBF's Ag Data Core Principles; and 3) recommend necessary modifications in the lease agreement to meet the AFBF core principles.

Goal 3 [CLO 3.1 (ELO 1.1, 2.1, 3.1, 3.2, 3.3)]

Goal 4 [CLO 4.1 (ELO 1.2, 2.1, 3.1, 3.2, 3.3)]

| Homework Rubric | |
|--|--------------------|
| Grading Scale 4-point scale – 4 (exceeds expectations - >90%, 3 (meets expectations - 80-90%, 2 (meets $\frac{2}{3}$ of the expectations 70-80%, 1 (meets $\frac{1}{3}$ of the expectations - 60-70%, and 0 (unsatisfactory - <60% | Score |
| Homework Requirements | 0 to 4 pts. |
| A. Write out the objective of the homework, do not include any irrelevant details | |
| B. Demonstrate thorough understanding of topic using complete and accurate information | |
| C. Present information in a knowledgeable manner | |
| D. Use three or more referenced resources to gather information including speaking with stakeholders and experts | |
| E. Use appropriate resources (peer reviewed publications, trade publications, websites, videos etc. using the ASABE Style Guide | |
| Subtotal | |
| Homework Organization | 0 to 4 pts. |
| 1. Visual appeal and clarity, figures and maps are neatly done with proper labeling | |
| 2. Legible, neatness, and creativity | |
| 3. Homework is complete and on time | |
| 4. Successfully meet the objective(s) of the homework | |
| 5. Written homework without any typos and clearly written | |
| Subtotal | |
| Total (0 to 40 pts.) | |

Guest Lecture Reflection

Students will view four (4) presentations by an Outside Expert and participate in question and answer sessions. Students will write 400 to 800 words answering that session questions and will be graded based on the rubric for these sessions. The questions are designed to elicit student's views, critique of the Expert presentation in relation to the impact on them as an individual, possible job opportunities, and impact on agricultural production, the environment and society (local, national, global). Materials should be cited using ASABE style by going to [Zotero Style Repository](#) then select [American Society of Agricultural and](#)

Biological Engineers.

Goal 3 [CLO 3.1 (ELO 1.1, 2.1, 3.1, 3.2, 3.3)]

Goal 4 [CLO 4.1 (ELO 1.2, 2.1, 3.1, 3.2, 3.3)]

Goal 5 [CLO 5.1 (ELO 1.1, 1.2, 2.1, 3.1, 3.2, 3.3)]

Technical Feasibility Study:

The objective of this assignment is to understand the implications of technology and its potential for adoption. You will develop a feasibility study document highlighting the implications of adopting a new technology or a practice. You should provide a thoughtful analysis of how this technology will affect the private sector (disruption, profitability, consolidation/decentralization, vertical integration, etc. based on your review of the existing literature and/or other sources of information. Imagine a company has approached you and you are responsible for putting together a feasibility study about a product/technology they desire to purchase or develop. Will this be a sound investment for the company, and what if any concerns should they be aware of regarding the regulatory landscape as well as social implications. A detailed rubric will be provided.

The Technical Feasibility Study will count for 20% of your final grade and *Draft* and *Final* should be ten (10) pages in length (11 pt. font, double spaced, and inclusive of figures). It should include the following sections: Introduction, Explanation of technology or practice, Meaningful insights about the technical feasibility, relevance, and credibility of the technology, Factors affecting adoption of the technology, Growth/adoption potential for proposed technology, Recommendations to improve technology adoption, Economic benefits of technology adoption and Creative visual presentation of data/information is encouraged. Due Week 13.

Goal 3 [CLO 3.1 (ELO 1.1, 2.1, 3.1, 3.2, 3.3)]

Goal 4 [CLO 4.1 (ELO 1.2, 2.1, 3.1, 3.2, 3.3)]

Goal 5 [CLO 5.1 (ELO 1.1, 1.2, 2.1, 3.1, 3.2, 3.3)]

Technical Feasibility Study (TFS) Sections and Due Dates

All sections should be 11 pt. font, double spaced.

1. 10 pts – **Topic title Due Week 2** No rubric
2. 15 pts – **Introduction (200+ words)** and relevance of the topic **Due Week 4**. Use the Introduction Section in the Technical Feasibility Study Rubric below
3. 15 pts– **References and Information Sources** -Background and literature sources **Due Week 6** Use the References and Information Sources Section in the Technical Feasibility Study Rubric below
4. 20 pts – **Draft – Due Week 11** Use Technical Feasibility Study Rubric below
5. 40 pts – Final version of the Technical Feasibility Study **Due Week 14** Use Technical Feasibility Study Rubric below

The rubric below is used for the draft and the final version point. Total 100 pts for Technical Feasibility Study

Technical Feasibility Study Rubric *[Draft points]* (Final points)

| Performance Indicator | Exceeds Expectations [4-6] (9-12 pts) | Meets Expectations [2-3] (6-9 pts) | Partially Meets Expectations [1-2] (3-6 pts) | Unsatisfactory [0-1] (0-3 pts) | Possible Points |
|--|--|---|--|--|-----------------|
| Introduction | Thoroughly, but concisely introduces technology/practice and excellent understanding of the technology. | Introduction sufficient, but slightly flawed. | Little introductory information; flawed and incomplete understanding of the technology. | Poorly stated or missing introductory information. | [6] (12) pts |
| Technology Description | Well-defined, clear technology description; supported by research that thoroughly, but concisely defines requirements. | Technology description sufficient; not stated in clear, concise manner; supported by research defines requirements. | Poor technology description; not stated in clear, concise manner; supported by research. | Flawed and/or incomplete understanding of the technology; not stated in clear, concise manner; no supporting research. | [6] (12) pts |
| Background and Relevance | Thoroughly, but concisely describes background and relevance information; excellent understanding of the technical topic and foundational information. | Background and relevance information sufficient, but slightly flawed. | Little background and relevance information; flawed and incomplete understanding of the technical topic. | Poorly stated or missing background and relevance information. | [6] (12) pts |
| Considerations for Adoption | Well-defined considerations for adoption; answers market potential; well-documented and clear considerations. | Considerations for adoption are sufficient, may lack creativity; addresses market potential; well documented. | Considerations for adoption lack creativity; partially addresses market potential; adequate documentation. | Considerations for adoption are lacking; do not address market potential; no creativity; poorly documented. | [6] (12) pts |
| Economic and Social Acceptance Analyses | Excellent, well-documented economic and social acceptance analyses. | Sound economic and social acceptance analyses. | Flawed and/or incomplete economic and social acceptance analyses. | Poorly developed economic and social acceptance analyses; do not meet minimal expectations. | [6] (12) pts |
| Performance Indicator | Exceeds Expectations [3-4] (6-8 pts) | Meets Expectations [2-3] (4-6 pts) | Partially Meets Expectations [1-2] (2-4 pts) | Unsatisfactory [0-1] (0-2 pts) | Possible Points |

| | | | | | |
|---|--|---|--|---|-------------|
| Final Recommendation | Definitive system solution recommendation, cost effective and well supported by thoughtful and complete analyses. | Sound system solution recommendation, is cost effective and supported by thoughtful analyses. | Flawed and/or incomplete system solution recommendation, biased towards a particular solution which is not supported by analyses. | Unclear recommendation; poorly support – lacking system(s) analyses and comparison of alternatives. | [4] (8) pts |
| Organization | Organization pattern is logical and conveys completeness and wholeness. | Organization pattern is logical and conveys completeness and wholeness with few lapses. | Attempt at organization, but little sense of wholeness and completeness. | Ad-hoc structure, little evidence of organization, little or no sense of wholeness and completeness. | [4] (8) pts |
| Grammar/Style | Consistently follows the rules for standard English. Uses effective language, makes engaging, appropriate word choices for audience/purpose. | Generally, follows the rules for standard English. Uses effective language and appropriate word choices for intended audience/purpose. | Generally, does not follow the rules of standard English. Limited and predictable vocabulary, perhaps not appropriate for intended audience/purpose. | Does not follow rules of standard English. Limited or inappropriate vocabulary for the intended audience and purpose. | [4] (8) pts |
| Figures and Tables | Figures and tables always support the text and are well designed. | Figures and tables generally support the text and are usually well designed. | Figures and tables sometimes support the text, and sometimes well designed. | Figures and tables do not support the text or are poorly designed. | [4] (8) pts |
| References and Information Sources | References and other sources of information cited for material used in the report. All sources support the discussion. | References and other sources of information cited for material used in the report. Most of the sources are appropriate to support the discussion. | References and other sources of information not cited for some material used in the report, or inappropriate sources cited. | References and other sources of information consistently not cited for material used in report. | [4] (8) pts |

Quizzes – Biweekly (selected questions may also be used in Exams)

10 questions 1 point each (true/false, multiple choice)

Given in Carmen, 3 attempts – highest score, Open Book Open Notes

Quizzes covering reading assignments will count for 10% of your final grade.

Goal 1 [CLO 1.1 (ELO 3.1, 3.2, 3.3); CLO 1.2 (ELO 1.1, 1.2, 2.1, 3.2)]

Goal 2 [CLO 2.1 (ELO 1.1, 2.1, 3.1, 3.2, 3.3); CLO 2.2 (ELO 1.1); CLO 2.3 (ELO 2.1, 3.2, 3.3);

CLO 2.4 (ELO 1.2, 2.1); CLO 2.5 (ELO 1.2, 2.1, 3.1, 3.2, 3.3); CLO 2.6 (ELO 1.2, 3.2, 3.3, 3.3)]

Goal 3 [CLO 3.1 (ELO 1.1, 2.1, 3.1, 3.2, 3.3)]



Goal 4 [CLO 4.1 (ELO 1.2, 2.1, 3.1, 3.2, 3.3)]
 Goal 5 [CLO 5.1 (ELO 1.1, 1.2, 2.1, 3.1, 3.2, 3.3)]

Exams (refer to the schedule)

50 questions each (true/false, multiple choice)
 Given in Carmen, 1 attempt, Closed Book and Notes
 Two Exams covering reading and lecture materials will count for 20% X 2 for 40%
 Goal 1 [CLO 1.1 (ELO 3.1, 3.2, 3.3); CLO 1.2 (ELO 1.1, 1.2, 2.1, 3.2)]
 Goal 2 [CLO 2.1 (ELO 1.1, 2.1, 3.1, 3.2, 3.3); CLO 2.2 (ELO 1.1); CLO 2.3 (ELO 2.1, 3.2, 3.3);
 CLO 2.4 (ELO 1.2, 2.1); CLO 2.5 (ELO 1.2, 2.1, 3.1, 3.2, 3.3); CLO 2.6 (ELO 1.2, 3.2, 3.3, 3.3)]
 Goal 3 [CLO 3.1 (ELO 1.1, 2.1, 3.1, 3.2, 3.3)]
 Goal 4 [CLO 4.1 (ELO 1.2, 2.1, 3.1, 3.2, 3.3)]
 Goal 5 [CLO 5.1 (ELO 1.1, 1.2, 2.1, 3.1, 3.2, 3.3)]

Final Exam (refer to the schedule)

50 questions each (true/false, multiple choice)
 Given in Carmen, 1 attempt, Closed Book and Notes
 A comprehensive final exam will be administered at the end of the semester during the regularly scheduled final exam period. You will be given sample questions during the last week of class.
 The final exam will count for 20% of your final grade.
 Goal 1 [CLO 1.1 (ELO 3.1, 3.2, 3.3); CLO 1.2 (ELO 1.1, 1.2, 2.1, 3.2)]
 Goal 2 [CLO 2.1 (ELO 1.1, 2.1, 3.1, 3.2, 3.3); CLO 2.2 (ELO 1.1); CLO 2.3 (ELO 2.1, 3.2, 3.3);
 CLO 2.4 (ELO 1.2, 2.1); CLO 2.5 (ELO 1.2, 2.1, 3.1, 3.2, 3.3); CLO 2.6 (ELO 1.2, 3.2, 3.3, 3.3)]
 Goal 3 [CLO 3.1 (ELO 1.1, 2.1, 3.1, 3.2, 3.3)]
 Goal 4 [CLO 4.1 (ELO 1.2, 2.1, 3.1, 3.2, 3.3)]
 Goal 5 [CLO 5.1 (ELO 1.1, 1.2, 2.1, 3.1, 3.2, 3.3)]

Grading Scale

| Grade | Range |
|-------|-------------------|
| A | 100 % to 93.0% |
| A- | < 93.0 % to 90.0% |
| B+ | < 90.0 % to 87.0% |
| B | < 87.0 % to 83.0% |
| B- | < 83.0 % to 80.0% |
| C+ | < 80.0 % to 77.0% |
| C | < 77.0 % to 73.0% |
| C- | < 73.0 % to 70.0% |
| D+ | < 70.0 % to 67.0% |
| D | < 67.0 % to 60.0% |

E

< 60.0 % to 0.0%

Academic integrity and collaboration:

Quizzes

You must complete the quizzes yourself, using your book or notes. Quizzes will be based on the announced content/weeks/lectures.

Exams

You must complete the final exam yourself, without any external help or communication.

Written Assignments

Your written assignments, including discussion posts, should be your own original work. In formal assignments, you should follow ASABE style to cite the ideas and words of your research sources. You are encouraged to ask a trusted person to proofread your assignments before you turn them in--but no one else should revise or rewrite your work.

Reusing Past Work

In general, you are prohibited in university courses from turning in work from a past class to your current class, even if you modify it. If you want to build on past research or revisit a topic you have explored in previous courses, please discuss the situation with me.

Falsifying Research or Results

All research you will conduct in this course is intended to be a learning experience; you should never feel tempted to make your results or your library research look more successful than it was.

Collaboration and Informal Peer-Review

The course includes many opportunities for formal collaboration with your classmates. While study groups and peer-review of major written projects is encouraged, remember that comparing answers on a quiz or assignment is not permitted. If you are unsure about a particular situation, please feel free just to ask ahead of time.

Late Assignments

Please refer to Carmen for due dates. Due dates are set to help you stay on pace and to allow timely feedback that will help you complete subsequent assignments.

- For the Homework or Guest Lecture Reflections you may drop a total of two of the lowest score of two (except as noted in the Evaluation section).
- Late work will have 20% of the total points deleted for each day it is late. Five (5) days late you will receive zero (0 points). This is based on the timestamp in Carmen, anything after the deadline is the next day and 20% off. In the case of documented emergency or illness, please contact the Course Coordinator as soon as possible to discuss accommodations, which will be determined on a case-by-case basis.

Instructor Feedback and Response Time

I am providing the following list to give you an idea of my intended availability throughout the course. Remember that you can call [614-688-4357 \(HELP\)](tel:614-688-4357) at any time if you have a technical problem.

- **Preferred contact method:** If you have a question, please contact me first through my Ohio State email address. I will reply to emails within **24 hours on days when class is in session at the university**.
- I am providing the following list to give you an idea of my intended availability throughout the course. Remember that you can call **614-688-HELP** at any time if you have a technical problem.
- **Class announcements:** I will send all important class-wide messages through the Announcements tool in CarmenCanvas. Please check [your notification preferences](https://go.osu.edu/canvas-notifications) (go.osu.edu/canvas-notifications) to ensure you receive these messages.
- **Discussion board:** I will check and reply to messages in the discussion boards once mid-week and once at the end of the week.
- **Grading and feedback:**
 - For large weekly assignments, you can generally expect feedback within 7 school days.
 - For exams, you can generally expect feedback within 2 weeks.

Other Course Policies

Discussion and Communication Guidelines

The following are my expectations for how we should communicate as a class. Above all, please remember to be respectful and thoughtful.

- **Writing style:** While there is no need to participate in class discussions as if you were writing a research paper, you should remember to write using good grammar, spelling, and punctuation. A more conversational tone is fine for non-academic topics.
- **Tone and civility:** Let's maintain a supportive learning community where everyone feels safe and where people can disagree amicably. Remember that sarcasm doesn't always come across online. I will provide specific guidance for discussions on controversial or personal topics.
- **Citing your sources:** When we have academic discussions, please cite your sources to back up what you say. For the textbook or other course materials, list at least the title and page numbers. For online sources, include a link.
- **Backing up your work:** Consider composing your academic posts in a word processor, where you can save your work, and then copying into the Carmen discussion.

Academic Integrity Policy

See [Descriptions of Major Course Assignments](#) for specific guidelines about collaboration and academic integrity in the context of this class.

Ohio State's Academic Integrity Policy

Academic integrity is essential to maintaining an environment that fosters excellence in teaching, research, and other educational and scholarly activities. Thus, The Ohio State University and the Committee on Academic Misconduct (COAM) expect that all students have read and understand the university's [Code of Student Conduct](http://studentconduct.osu.edu) (studentconduct.osu.edu), and that all students will complete all academic and scholarly assignments with fairness and honesty. Students must recognize that failure to follow the rules and guidelines established in the university's *Code of Student Conduct* and this syllabus may constitute "Academic Misconduct."

The Ohio State University's *Code of Student Conduct* (Section 3335-23-04) defines academic misconduct as: "Any activity that tends to compromise the academic integrity of the university or subvert the educational process." Examples of academic misconduct include (but are not limited to) plagiarism, collusion (unauthorized collaboration, copying the work of another student, and possession of unauthorized materials during an examination. Ignorance of the university's *Code of Student Conduct* is never considered an excuse for academic misconduct, so I recommend that you review the *Code of Student Conduct* and, specifically, the sections dealing with academic misconduct.

If I suspect that a student has committed academic misconduct in this course, I am obligated by university rules to report my suspicions to the Committee on Academic Misconduct. If COAM determines that you have violated the university's Code of Student Conduct (i.e., committed academic misconduct, the sanctions for the misconduct could include a failing grade in this course and suspension or dismissal from the university.

If you have any questions about the above policy or what constitutes academic misconduct in this course, please contact me.

Other sources of information on academic misconduct (integrity to which you can refer include:

- [Committee on Academic Misconduct](http://go.osu.edu/coam) (go.osu.edu/coam)
- [Ten Suggestions for Preserving Academic Integrity](http://go.osu.edu/ten-suggestions) (go.osu.edu/ten-suggestions)
- [Eight Cardinal Rules of Academic Integrity](http://go.osu.edu/cardinal-rules) (go.osu.edu/cardinal-rules)

Copyright for Instructional Materials

The materials used in connection with this course may be subject to copyright protection and are only for the use of students officially enrolled in the course for the educational purposes associated with the course. Copyright law must be considered before copying, retaining, or disseminating materials outside of the course.

Creating an Environment Free from Harassment, Discrimination, and Sexual Misconduct

The Ohio State University is committed to building and maintaining a community to reflect diversity and to improve opportunities for all. All Buckeyes have the right to be free from harassment, discrimination, and sexual misconduct. Ohio State does not discriminate on the basis of age, ancestry, color, disability, ethnicity, gender, gender identity or expression, genetic information, HIV/AIDS status, military status, national origin, pregnancy (childbirth, false pregnancy, termination of pregnancy, or recovery therefrom), race, religion, sex, sexual orientation, or protected veteran status, or any other bases under the law, in its activities, academic programs, admission, and employment. Members of the university community also have the right to be free from all forms of sexual misconduct: sexual harassment, sexual assault, relationship violence, stalking, and sexual exploitation.

To report harassment, discrimination, sexual misconduct, or retaliation and/or seek confidential and non-confidential resources and supportive measures, contact the Office of Institutional Equity:

1. Online reporting form at equity.osu.edu,
2. Call 614-247-5838 or TTY 614-688-8605,
3. Or email equity@osu.edu

The university is committed to stopping sexual misconduct, preventing its recurrence, eliminating any hostile environment, and remedying its discriminatory effects. All university employees have reporting responsibilities to the Office of Institutional Equity to ensure the university can take appropriate action:

- All university employees, except those exempted by legal privilege of confidentiality or expressly identified as a confidential reporter, have an obligation to report incidents of sexual assault immediately.

- The following employees have an obligation to report all other forms of sexual misconduct as soon as practicable but at most within five workdays of becoming aware of such information: 1. Any human resource professional (HRP); 2. Anyone who supervises faculty, staff, students, or volunteers; 3. Chair/director; and 4. Faculty member.

Counseling and Consultation Services/Mental Health

As a student you may experience a range of issues that can cause barriers to learning, such as strained relationships, increased anxiety, alcohol/drug problems, feeling down, difficulty concentrating and/or lack of motivation. These mental health concerns or stressful events may lead to diminished academic performance or reduce a student's ability to participate in daily activities. No matter where you are engaged in distance learning, The Ohio State University's Student Life Counseling and Consultation Service (CCS) is here to support you. If you find yourself feeling isolated, anxious or overwhelmed, [on-demand mental health resources](http://go.osu.edu/ccsondemand) (go.osu.edu/ccsondemand) are available. CCS is located on the 4th Floor of the Younkin Success Center and 10th Floor of Lincoln Tower. You can reach an on-call counselor when CCS is closed at **614- 292-5766**. **24-hour emergency help** is available through the [24/7 National Suicide Prevention Lifeline website](http://247.NationalSuicidePreventionLifeline.org) (suicidepreventionlifeline.org) or by calling [1-800-273-8255\(TALK\)](tel:18002738255). [The Ohio State Wellness app](http://go.osu.edu/wellnessapp) (go.osu.edu/wellnessapp) is also a great resource.

David Wirt, wirt.9@osu.edu, is the CFAES embedded mental health counselor. He is available for new consultations and to establish routine care. To schedule with David, please call 614-292-5766. Students should mention their affiliation with CFAES when setting up a phone screening.

Accessibility Accommodations for Students with Disabilities

Requesting Accommodations

The university strives to make all learning experiences as accessible as possible. If you anticipate or experience academic barriers based on your disability including mental health, chronic or temporary medical conditions, please let me know immediately so that we can privately discuss options. To establish reasonable accommodations, I may request that you register with [Student Life Disability Services \(SLDS\)](#). After registration, make arrangements with me as soon as possible to discuss your accommodations so that they may be implemented in a timely fashion. In light of the current pandemic, students seeking to request COVID-related accommodations may do so through the university's request process, managed by Student Life Disability Services.

Disability Services Contact Information

- Phone: [614-292-3307](tel:614-292-3307)
- Website: slds.osu.edu
- Email: slds@osu.edu
- In person: [Baker Hall 098, 113 W. 12th Avenue](#)

Accessibility of Course Technology

This online course requires use of CarmenCanvas (Ohio State's learning management system and other online communication and multimedia tools. If you need additional services to use these technologies, please request accommodations as early as possible.

- [CarmenCanvas accessibility](http://go.osu.edu/canvas-accessibility) (go.osu.edu/canvas-accessibility)
- Streaming audio and video
- [CarmenZoom accessibility](http://go.osu.edu/zoom-accessibility) (go.osu.edu/zoom-accessibility)
- Overview of Accessibility at OSU [OSU Privacy](#)

Specific course software's accessibility privacy statements

Vendor Accessibility

[Carmen \(Canvas accessibility\)](#)
[CarmenZoom accessibility](#)
[Adobe Connect \(Carmen Connect Accessibility\)](#)
[MediaSite Accessibility Statement](#)
[Microsoft Office Accessibility](#)
[Proctorio Accessibility](#)
[Top Hat Accessibility](#)

Vendor Privacy

[Carmen \(Canvas/Infrastructure Privacy\)](#)
[CarmenZoom Privacy](#)
[Adobe Privacy Policy](#)
[MediaSite Privacy](#)
[Microsoft Office 365 Privacy](#)
[Proctorio Privacy](#)
[Top Hat Privacy](#)

Course Schedule

Refer to the CarmenCanvas course for up-to-date deadlines.

| Lecture# | Week | Date | Tentative Topics, Readings, Assignments, Due Dates | Assignments, Assessments | Learning Outcomes | Instructor |
|----------|------|-----------|--|----------------------------------|---|------------|
| 1 | 1 | T 1/11/22 | Introduction to Digital Agriculture | | CLO 1.1, 1.2 CLO 2.1 | Shearer |
| 2 | 1 | R 1/13/22 | Global Navigation Satellite Systems | | CLO 1.1 | Shearer |
| 3 | 2 | T 1/18/22 | Geographic Information Systems and Coordinate Conversions | | CLO 1.1, 1.2 CLO 2.1, 2.2 | Shearer |
| 4 | 2 | R 1/20/22 | Farm Management Information Systems | TFS Topic Title | CLO 2.1, CLO 4.1 | Shearer |
| 5 | 3 | T 1/25/22 | Variable Rate Technology and its application in sustainable agriculture. | Quiz 1/25/22 HWK1 1/24/22 | CLO 1.1, 1.2 CLO 2.1, 2.3 CLO 5.1 | Shearer |
| 6 | 3 | R 1/27/22 | Soil Sampling and Sensing | | CLO 1.1, 1.2 CLO 2.2 | Shearer |
| 7 | 4 | T 2/1/22 | Yield Monitoring in digital agriculture | | CLO 1.1, 1.2 CLO 2.1, 2.2 | Shearer |
| 8 | 4 | R 2/3/22 | Yield Mapping in digital agriculture and its application in variable rate applications | TFS Introduction | CLO 1.1 CLO 2.1, 2.2 | Shearer |
| 9 | 5 | T 2/8/22 | Artificial Intelligence Basics | Quiz 2 2/8/22 HWK2 1/31/22 | CLO 2.6 | Shearer |
| 10 | 5 | R 2/10/22 | Artificial Intelligence in Crop Care | | CLO 2.6 | Shearer |
| 11 | 6 | T 2/15/22 | Controller Area Networks and Decoding CAN Signals | | CLO 1.1 CLO 2.1, 2.2, 2.3 | Shearer |
| 12 | 6 | R 2/17/22 | Data, Ownership, Ethics, Security, Computing & Storage | TFS Reference and Information | CLO 1.2 CLO 2.2, 2.3 | Shearer |
| 13 | 7 | T 2/22/22 | Google Earth and its application in digital agriculture | Quiz 3 2/22/22 HWK3 2/21/22 | CLO 1.1 | Shearer |
| 14 | 7 | R 2/24/22 | Remote Sensing and its application in digital agriculture | | CLO 2.2 | Shearer |
| 15 | 8 | T 3/1/22 | Drones, Small Unmanned Aerial Systems, and their application in digital agriculture. | | CLO 1.1 CLO 2.2 | Shearer |
| 16 | 8 | R 3/3/22 | Precision Conservation Management | | CLO 2.2 | Shearer |

| | | | | | | |
|----|-----------|--------------------|--|--------------------------------|-------------------------------|-----------|
| 17 | 9 | T 3/8/22 | Controlled Environment Production | Quiz 4 3/8/22 HWK4 3/7/22 | CLO 2.2 CLO 3.1 | TBD |
| 18 | 9 | R 3/10/22 | Weather Data and its application in digital agriculture. | | CLO 2.2 | Lindsey |
| | 10 | T 3/15/22 | Spring Break | | | |
| | 10 | R 3/17/22 | Spring Break | | | |
| 19 | 11 | T 3/22/22 | Precision Irrigation and Drainage | | CLO 1.1 CLO 2.2 | Lindsey |
| 20 | 11 | R 3/24/22 | Crop and Animal Modeling | TFS Draft | CLO 2.1 CLO 4.1 CLO 5.1 | Barker |
| 21 | 12 | T 3/29/22 | Precision Livestock Farming | | CLO 2.2 CLO 3.1 | Barker |
| 22 | 12 | R 3/31/22 | Pasture Based Livestock Production | | CLO 2.2 CLO 4.1 | Barker |
| 23 | 13 | T 4/5/22 | On-Farm Research and its role in digital agriculture. | Quiz 5 4/5/22 HWK5 4/4/22 | CLO 1.1 CLO 5.1 | Barker |
| 24 | 13 | R 4/7/22 | Data Analytics and Visualization of digital agriculture data, and their application to decision making | TFS 4/7/22 | CLO 1.2 CLO 3.1 | Barker |
| 25 | 14 | T 4/12/22 | Internet of Things (IoT) and their application in digital agriculture | | CLO 2.2 | Signorini |
| 26 | 14 | R 4/14/22 | AI in Marketing and Agricultural Supply Chain Logistics. | | CLO 1.2 CLO 2.6 | Signorini |
| 27 | 15 | T 4/19/22 | Blockchain and Cryptocurrencies | Quiz 6 4/19/22 HWK6 4/11/22 | CLO 1.2 CLO 4.1 | Signorini |
| 28 | 15 | R 4/21/22 | Enterprise Agriculture | | CLO 1.1 CLO 2.5 CLO 5.1 | Signorini |
| | | 4/27 to 5/23/22 | Finals | | | |

Interdisciplinary Team-Taught Course Inventory

Overview

The GE allows students to take a single, 4+ credit course to satisfy a particular GE Theme requirement if that course includes key practices that are recognized as integrative and high impact. Courses seeking one of these designations need to provide a completed Integrative Practices Inventory at the time of course submission. This will be evaluated with the rest of the course materials (syllabus, Theme Course submission document, etc). Approved Integrative Practices courses will need to participate in assessment both for their Theme category and for their integrative practice.

Please enter text in the boxes below to describe how your class will meet the expectations of Interdisciplinary Team-Taught courses. It may be helpful to consult the Description & Expectations document for this pedagogical practice or to consult your Director of Undergraduate Studies or appropriate support staff person as you complete this Inventory and submit your course.

Please use language that is clear and concise and that colleagues outside of your discipline will be able to follow. You are encouraged to refer specifically to the syllabus submitted for the course, since the reviewers will also have that document. Because this document will be used in the course review and approval process, you should be as specific as possible, listing concrete activities, specific theories, names of scholars, titles of textbooks etc.

Accessibility

If you have a disability and have trouble accessing this document or need to receive it in another format, please reach out to Meg Daly at daly.66@osu.edu or call 614-247-8412.

Pedagogical Practices for Interdisciplinary Team-Taught Courses

Course subject & number

Performance expectations set at appropriately high levels (e.g. Students investigate large, complex problems from multiple disciplinary perspectives). Please link this expectation to the course goals, topics and activities and indicate *specific* activities/assignments through which it will be met. (50-500 words)

Interdisciplinary Team-Taught Course Inventory

Significant investment of time and effort by students over an extended period of time (e.g., engage the issue iteratively, analyzing with various lenses and seeking to construct an integrative synthesis). Please link this expectation to the course goals, topics and activities and indicate *specific* activities/assignments through which it will be met. (50-500 words)

Interactions with faculty and peers about substantive matters including regular, meaningful faculty mentoring and peer support about conducting interdisciplinary inquiry. Please link this expectation to the course goals, topics and activities and indicate *specific* activities/assignments through which it will be met. (50-500 words)

Interdisciplinary Team-Taught Course Inventory

Students will get frequent, timely, and constructive feedback on their work, scaffolding multiple disciplinary perspectives and integrative synthesis to build over time. Please link this expectation to the course goals, topics and activities and indicate *specific* activities/assignments through which it will be met. (50-500 words)

Periodic, structured opportunities to reflect and integrate learning (e. g. students should work to integrate their insights and construct a more comprehensive perspective on the issue). Please link this expectation to the course goals, topics and activities and indicate *specific* activities/assignments through which it will be met. (50-500 words)

Interdisciplinary Team-Taught Course Inventory

Opportunities to discover relevance of learning through real-world applications and the integration of course content to contemporary global issues and contexts. Please link this expectation to the course goals, topics and activities and indicate *specific* activities/assignments through which it will be met. (50-500 words)

Public Demonstration of competence, such as a significant public communication of their integrative analysis of the issue. Please link this expectation to the course goals, topics and activities and indicate *specific* activities/assignments through which it will be met. (50-500 words)

Interdisciplinary Team-Taught Course Inventory

Experiences with diversity wherein students demonstrate intercultural competence and empathy with people and worldview frameworks that may differ from their own. Please link this expectation to the course goals, topics and activities and indicate *specific* activities/assignments through which it will be met. (50-500 words)

Explicit and intentional efforts to promote inclusivity and a sense of belonging and safety for students, e.g. universal design principles, culturally responsive pedagogy, structured development of cultural self-awareness. Please link this expectation to the course goals, topics and activities and indicate *specific* activities/assignments through which it will be met. (50-500 words)

Interdisciplinary Team-Taught Course Inventory

Clear plans to promote this course to a diverse student body and increase enrollment of typically underserved populations of students. Please link this expectation to the course goals, topics and activities and indicate *specific* activities/assignments through which it will be met. (50-500 words)

GE THEME COURSES

Overview

Courses that are accepted into the General Education (GE) Themes must meet two sets of Expected Learning Outcomes (ELOs): those common for all GE Themes and one set specific to the content of the Theme. This form begins with the criteria common to all themes and has expandable sections relating to each specific theme.

A course may be accepted into more than one Theme if the ELOs for each theme are met. Courses seeing approval for multiple Themes will complete a submission document for each theme. Courses seeking approval as a 4-credit, Integrative Practices course need to complete a similar submission form for the chosen practice. It may be helpful to consult your Director of Undergraduate Studies or appropriate support staff person as you develop and submit your course.

Please enter text in the boxes to describe how your class will meet the ELOs of the Theme to which it applies. Please use language that is clear and concise and that colleagues outside of your discipline will be able to follow. You are encouraged to refer specifically to the syllabus submitted for the course, since the reviewers will also have that document. Because this document will be used in the course review and approval process, you should be as specific as possible, listing concrete activities, specific theories, names of scholars, titles of textbooks etc.

Course subject & number

General Expectations of All Themes

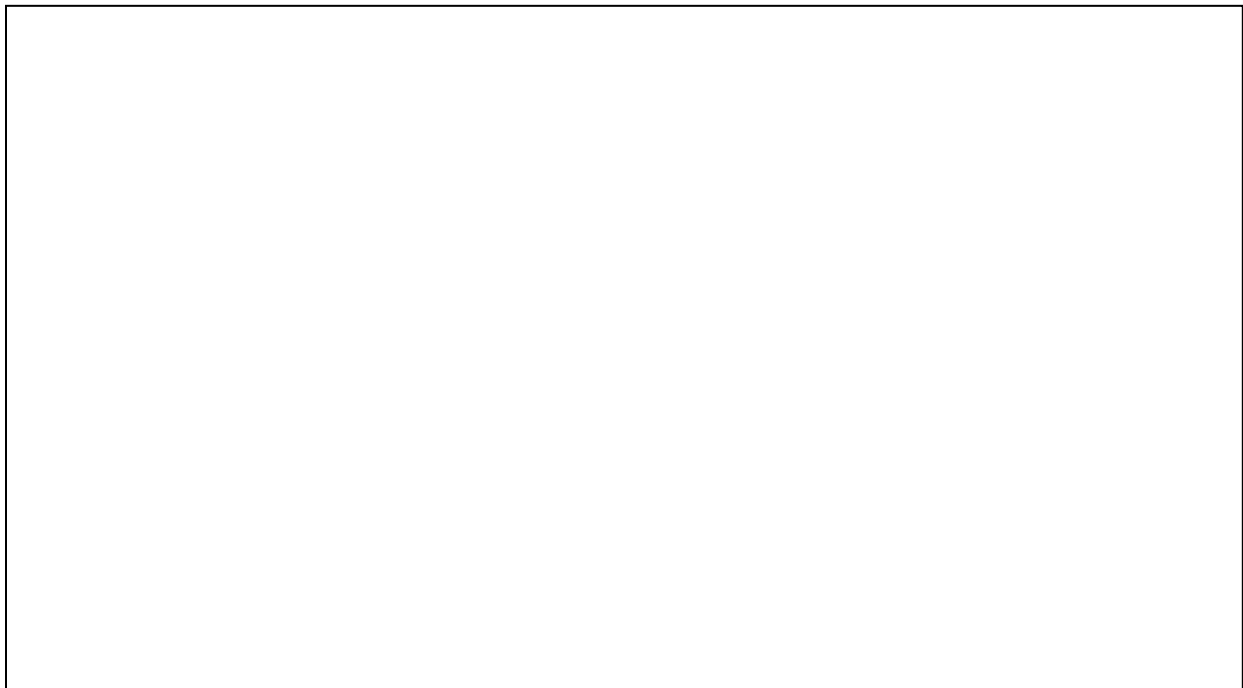
GOAL 1: Successful students will analyze an important topic or idea at a more advanced and in-depth level than the foundations.

Please briefly identify the ways in which this course represents an advanced study of the focal theme. In this context, “advanced” refers to courses that are e.g., synthetic, rely on research or cutting-edge findings, or deeply engage with the subject matter, among other possibilities. *(50-500 words)*

Course subject & number

ELO 1.1 Engage in critical and logical thinking about the topic or idea of the theme. Please link this ELO to the course goals and topics and indicate *specific* activities/assignments through which it will be met. (50-700 words)

ELO 1.2 Engage in an advanced, in-depth, scholarly exploration of the topic or idea of the theme. Please link this ELO to the course goals and topics and indicate *specific* activities/assignments through which it will be met. (50-700 words)

A large, empty rectangular box with a thin black border, intended for the student to write their response to the ELOs. The box is currently blank.

Course subject & number

GOAL 2: Successful students will integrate approaches to the theme by making connections to out-of-classroom experiences with academic knowledge or across disciplines and/or to work they have done in previous classes and that they anticipate doing in future.

ELO 2.1 Identify, describe, and synthesize approaches or experiences as they apply to the theme.

Please link this ELO to the course goals and topics and indicate *specific* activities/assignments through which it will be met. (50-700 words)

ELO 2.2 Demonstrate a developing sense of self as a learner through reflection, self-assessment, and creative work, building on prior experiences to respond to new and challenging contexts. Please link this ELO to the course goals and topics and indicate *specific* activities/assignments through which it will be met.

(50-700 words)

Course subject & number

Specific Expectations of Courses in Sustainability

GOAL 1: Students analyze and explain how social and natural systems function, interact, and evolve over time; how human wellbeing depends on these interactions; how actions have impacts on subsequent generations and societies globally; and how human values, behaviors, and institutions impact multi-faceted, potential solutions across time.

1.1 Describe elements of the fundamental dependence of humans on Earth and environmental systems and on the resilience of these systems. Please link this ELO to the course goals and topics and indicate *specific* activities/assignments through which it will be met. (50-700 words)

Course subject & number

1.2 Describe, analyze and critique the roles and impacts of human activity and technology on both human society and the natural world, in the past, currently, and in the future. Please link this ELO to the course goals and topics and indicate *specific* activities/assignments through which it will be met. (50-700 words)

1.3 Devise informed and meaningful responses to problems and arguments in the area of sustainability based on the interpretation of appropriate evidence and an explicit statement of values. Please link this ELO to the course goals and topics and indicate *specific* activities/assignments through which it will be met. (50-700 words)

Trefz, Kelvin

From: Shearer, Scott A.
Sent: Friday, December 10, 2021 9:10 AM
To: Sharp, Jeff; Haab, Timothy; peffer.1@osu.edu; Arora, Anish; Imbert, Dorothee; Munroe, Darla; MacKay, Allison A.
Cc: Barker, David; Karcher, Doug; Gardner, David; Chen, Qian; Venkatesh, Ramarao; Trefz, Kelvin; Luikart, Meredith
Subject: New Course Concurrence for AGSYSMT/HCS 3585 and 3586
Attachments: AGSYSMT_3585_Syllabus.docx; AGSYSMT_3586_Syllabus.docx; HCS_3585_Syllabus.docx; HCS_3586_Syllabus.docx; Course_Review_Concurrence_Form_3585_20211210.pdf; Course_Review_Concurrence_Form_3586_20211210.pdf

Jeff, Tim, Pasha, Anish, Dorothee, Darla and Allison:

Please accept this email as a formal request for concurrence on two new courses *AGSYSMT 3585/HCS 3585 - Digital Agriculture* and *AGSYSMT 3586/HCS 3586 - Digital Agriculture Laboratory* to be offered by FABE (Food, Agricultural and Biological Engineering) and HCS (Horticulture & Crop Science) beginning Spring Semester '23 under the new GE curriculum (Sustainability Thematic Course) . Given the technology and analytical focus of this course I feel that it is best to obtain concurrence prior to starting the formal course review process.

Please review the attached syllabi for FABE and HCS and the joint concurrence forms. The syllabi are the same for both course as they are cross-listed. Feel free to contact me if you have questions or need additional information. I want to thank you in advance for your attention to this request. We are working on a tight submission deadline, so early action will be appreciated.

Regards,
Scott



Scott A. Shearer, PhD, PE | Professor and Chair
Food, Agricultural and Biological Engineering | 200A Agricultural Engineering Building
590 Woody Hayes Drive | Columbus, OH 43210-1058
Office: 614.292.7284 | Mobile: 859.509.5026 | FAX: 614.292.9448
www.fabe.osu.edu | twitter.com/ScottShearer95

