

## **Term Information**

Effective Term Spring 2024

## **General Information**

Course Bulletin Listing/Subject Area Environmental Engineering  
Fiscal Unit/Academic Org Civil, Envrnmntl & Geodtc Eng - D1427  
College/Academic Group Engineering  
Level/Career Undergraduate  
Course Number/Catalog 3600  
Course Title Technology Innovation for Sustainability  
Transcript Abbreviation Tech Innov Sustain  
Course Description Society faces many challenges in terms of improving its environmental challenges. This course is designed to expose you to many of these challenges and the different technical and non-technical perspectives that will be necessary to understand and create solutions and a more sustainable future.  
Semester Credit Hours/Units Fixed: 4

## **Offering Information**

Length Of Course 14 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 Laboratory, Lecture  
Grade Roster Component Laboratory  
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 None  
Exclusions None  
Electronically Enforced Yes

## **Cross-Listings**

Cross-Listings

## **Subject/CIP Code**

Subject/CIP Code 14.1401  
Subsidy Level Baccalaureate Course  
Intended Rank Freshman, Sophomore, Junior

## **Requirement/Elective Designation**

Sustainability

## **Course Details**

### **Course goals or learning objectives/outcomes**

- Students will understand theories of sustainability that are commonly used in the engineering profession.
- Students will understand lean launchpad approaches to characterizing and describing business models and value propositions of technologies.
- Students will know how to calculate and evaluate sustainability metrics to evaluate interventions to improve the sustainability of engineered systems.
- Students will be able to perform, document, and interpret customer discovery interviews.

### **Content Topic List**

- Humans, Technology, and the Environment
- Grand Challenges in Sustainability
- The Triple-Bottom Line & Life-Cycle Thinking
- Class Project Sustainability Challenge
- The Business Model Canvas (BMC) and the Value Proposition Diagram (VPD)
- Lean Launchpad and Hypothesis-Driven Testing
- Completing the VPD; Developing Hypotheses
- Developing Interview Protocols; Understanding the Business Ecosystem
- Customer Discovery Interviews (CDIs)
- Sustainability Metrics
- Carbon Footprinting
- Carbon Footprinting; Uncertainty Assessment
- Analyzing CDIs
- Analyzing CDIs
- From Idea-to-Market

### **Sought Concurrence**

Yes

**Attachments**

- 3600\_Innovation for Sustainability.pdf: Syllabus  
*(Syllabus. Owner: Tolchin, Barry Scott)*
- [EEOB] ENVENG 3600 Concurrence EEOB.pdf: Concurrence  
*(Concurrence. Owner: Tolchin, Barry Scott)*
- [ENR] ENVENG 3600 Concurrence, Reviewed and approved by SENR AAC on march 6.pdf: Concurrence  
*(Concurrence. Owner: Tolchin, Barry Scott)*
- [GEOG] concurrence.pdf: Concurrence  
*(Concurrence. Owner: Tolchin, Barry Scott)*
- [Moritz] ENVENG 3600 Concurrence Email.pdf: Concurrence  
*(Concurrence. Owner: Tolchin, Barry Scott)*
- [Public Health] ENVENG 3600 Concurrence.pdf: Concurrence  
*(Concurrence. Owner: Tolchin, Barry Scott)*
- [SCBE] concurrence form.pdf: Concurrence  
*(Concurrence. Owner: Tolchin, Barry Scott)*
- ENVENG 3600 R&CI Form.pdf: Additional Documents  
*(Other Supporting Documentation. Owner: Tolchin, Barry Scott)*
- ENVENG 3600 Sustainability Form.pdf: Additional Documents  
*(Other Supporting Documentation. Owner: Tolchin, Barry Scott)*
- Concurrence email.pdf: Concurrence  
*(Concurrence. Owner: Tolchin, Barry Scott)*

**Comments**

- We know this is late for Spring 2024, so if it cannot be approved in time, we will offer in SP25. *(by Tolchin, Barry Scott on 09/05/2023 10:29 AM)*

**Workflow Information**

Status	User(s)	Date/Time	Step
Submitted	Tolchin, Barry Scott	09/08/2023 01:12 PM	Submitted for Approval
Revision Requested	Tolchin, Barry Scott	09/10/2023 01:18 PM	Unit Approval
Submitted	Tolchin, Barry Scott	09/10/2023 01:19 PM	Submitted for Approval
Approved	Quinzon-Bonello, Rosario	09/26/2023 03:06 PM	Unit Approval
Approved	Quinzon-Bonello, Rosario	09/26/2023 03:06 PM	College Approval
Pending Approval	Jenkins, Mary Ellen Bigler Hanlin, Deborah Kay Hilty, Michael Neff, Jennifer Vankeerbergen, Bernadette Chantal Steele, Rachel Lea	09/26/2023 03:06 PM	ASCCAO Approval

# Environmental Engineering 3600 Syllabus

## Technology Innovation for Sustainability

3 credit hour lecture + 1 credit hour lab

The course fulfills the GE Sustainability Theme.

### Instructor Information

Instructor	Email	Office Hours & Location
Daniel B. Gingerich	gingerich.62@osu.edu	TBD

### Catalog Description

Application of quantitative sustainability assessment and innovation methods to create, ideate, and evaluate technological solutions to grand sustainability challenges facing society.

### Course Description

Society faces many challenges in terms of improving its environmental challenges. From meeting the energy, food, and water needs of a growing (and developing) global population; to building communities that are resilient and healthy; and combatting and adapting to climate change, engineers, architects and planners will play crucial roles in solving pressing sustainability challenges. This course is designed to expose you to many of these challenges and the different technical and non-technical perspectives that will be necessary to understand and create solutions and a more sustainable future.

But to truly solve these challenges, engineers, architects, and planners will not be able to deploy solutions from above and hope they make a difference. Instead, technologists will need to work closely with potential stakeholders to understand their needs and use cases. To that end, this course will expose you to concepts from the *Lean Launchpad* methodology to help you understand how the market for sustainable technologies and to evaluate the environmental and economic impact of potential innovations using a variety of *quantitative life-cycle methods* to assess sustainability.

### Course Textbook

The following textbooks are required for the course.

I have placed two copies of the first book on reserve at the 18<sup>th</sup> Avenue Library, but you may want to purchase some version (physical or digital) of the following text for your own use:

Bakshi, B. (2019). Sustainable Engineering: Principles and Practice. Cambridge, ISBN 978-1-108-42045-7.

**Do not buy the following books.** The first one is available online, free of charge through the Ohio State Library.  
Osterwalder, A. (2010). Business model generation: a handbook for visionaries, game changers, and challengers. Wiley, ISBN: 978-0-470-90103-8.

The last two books are available online as free PDFs with instructions to access them posted to Carmen.

Constable, G. (2014). Talking to Humans. ISBN: 978-0-9908009-0-3.

Constable, G. (2018). Testing with Humans. ISBN: 978-0-9908009-4-1.

In addition to these four required books, there is one optional book that you may find helpful for more context on start-ups and the process of taking technology from customer discovery to market.

Blank, S. and Dorf, B. (2012). The Startup-Owners Manual: The Step-by-Step Guide to Building a Great Company. K&S Ranch, ISBN: 978-0984999309.

## Course Goals and Learning Outcomes

### **Goal A – Students will understand theories of sustainability that are commonly used in the engineering profession.**

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- Learning Outcome 1 – Students will be able to discuss sustainability and environmental challenges facing society.
- Learning Outcome 2 – Students will be able to identify features of sustainability approaches and theories from outside of engineering.
- Learning Outcome 3 – Students will be able to distinguish between the three bottom lines in the triple bottom line approach to sustainability.
- Learning Outcome 4 – Students will be able to describe methods used to quantify different bottom lines.

### **Goal B – Students will understand lean launchpad approaches to characterizing and describing business models and value propositions of technologies.**

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- Learning Outcome 1 – Students will be able to describe the individual components of the business model canvas.
- Learning Outcome 2 – Students will be able to describe the individual components of the value proposition canvas.
- Learning Outcome 3 – Students will be able to describe the aspects of get-grow strategies.

### **Goal C – Students will know how to use customer discovery tools to create and test business models and value propositions.**

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- Learning Outcome 1 – Students will be able to develop testable hypotheses about the value propositions and business model for a technology for a customer and others in the business ecosystem.
- Learning Outcome 2 – Students will be able to develop customer discovery interview protocols that allow them to test hypotheses about the value proposition and business model.
- Learning Outcome 3 – Students will be able to evaluate learnings from customer discovery interviews and how they support fail to support hypotheses about the customer.

### **Goal D – Students will know how to calculate and evaluate sustainability metrics to evaluate interventions to improve the sustainability of engineered systems.**

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- Learning Outcome 1 – Students will be able to develop life-cycle diagrams for common consumer products and goods from cradle-to-grave.
- Learning Outcome 2 – Students will be able to find data from public databases and other reputable sources for use in sustainability assessment.
- Learning Outcome 3 – Students will be able to calculate the carbon footprint of a product.

### **Goal E – Students will be able to perform, document, and interpret customer discovery interviews.**

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- Learning Outcome 1 – Students will be able to appropriately reach out to potential interview participants to schedule interviews.
- Learning Outcome 2 – Students will be able to ask appropriate follow-up questions to better understand customer/stakeholder perspectives
- Learning Outcome 3 – Students will be able to create documentation of customer discovery interviews that note questions asked and responses from interview participants
- Learning Outcome 4 – Students will be able to develop a representative value proposition diagram for a group of stakeholders/customers.
- Learning Outcome 4 – Students will be able to identify similarities and differences in the value proposition diagrams developed for different stakeholder groups.

See the ABET Outcomes and Sustainable General Education Theme sections at the end of this syllabus for a mapping of how these course goals/ELOs map onto the outcomes and objectives of these two programs.

**Course Schedule**

Week	Topic	Corresponding ELOs
1	Humans, Technology, and the Environment	A.1, A.2
2	Grand Challenges in Sustainability	A.1, A.2
3	The Triple-Bottom Line & Life-Cycle Thinking	A.1, A.3, A.4, D.1
4	Class Project Sustainability Challenge	A.1, A.2
5	The Business Model Canvas (BMC) and the Value Proposition Diagram (VPD)	B.1, B.2
6	Lean Launchpad and Hypothesis-Driven Testing	B.1, B.2, C.1
7	Completing the VPD; Developing Hypotheses	B.2, C.1, C.2
8	Developing Interview Protocols; Understanding the Business Ecosystem	B.2, C.2
9	Customer Discovery Interviews (CDIs)	C.2, E.1, E.2, E.3
10	Sustainability Metrics	A.4, D.1
11	Carbon Footprinting	D.1, D.2, D.3
12	Carbon Footprinting; Uncertainty Assessment	D.2, D.3
13	Analyzing CDIs	C.3, E.4
14	Analyzing CDIs	E.4, E.5
15	From Idea-to-Market	B.3

### Grade Distribution and Assessment

Component	Grade
In-Class Engagement	10%
Weekly Quizzes	30%
Reflections	20%
Project	40%

Grade Range	Grade
93-100	A
90-92.9	A-
87-89.9	B+
83-86.9	B
80-82.9	B-
77-79.9	C+
73-76.9	C
70-72.9	C-
67-69.9	D+
63-66.9	D
60-62.9	D-
<60	F

### Assessment Details

#### In-Class Engagement

These assessments are designed to keep you engaged in class. These assessments may involve some TopHat quizzes in which you will make a prediction or submit results of calculations you have just made. They are designed to follow best pedagogical practices to keep you engaged in class and to provide me with real-time information that would allow me to adjust mid-lecture. As a result, their usefulness is specific to the session in which they take place.

#### Weekly Quizzes

There will be a quiz every week except the first and last week of the course. These quizzes will be administered via Carmen. These quizzes are designed to assess your knowledge of course content and to help you keep pace with the class as we move forward. I will drop your lowest quiz score.

#### Reflections

Throughout the course of the semester, you will be assigned to reflect on your work. These reflections will be opportunities for you to reflect on what you have learned, your progress on the group project, how you might apply what you have learned to your group project, and the decisions your group is making as you progress in the project.

#### Course Project

Over the course of the semester, you will work as part of a group on a project to develop a possible solution for our sustainability challenge case study. Instructions on the project will be posted to Carmen and discussed in class. This project will be broken down into many different pieces throughout the semester:

- *Solution Proposal (5% of grade)*. With your team you will submit a two-page description of the technical solution you plan to study for the proposal, including the a description of the piece of the challenge you plan to tackle, your initial hypotheses about your customers, and the design process you went through as a team to come to this solution. This is designed to allow me to provide feedback and address issues that may come up.
- *Draft Business Model Canvas and Value Proposition Diagram (8% of grade)*. Before starting your customer discovery interviews, you will submit a draft of your business model canvas and a value proposition diagram for a specific customer segment that includes your initial falsifiable hypothesis.
- *Revised Value Proposition Diagram (12% of grade)*. After completing your 10-15 customer discovery interviews, you will submit a revised draft of your value proposition diagram, with a summary of your interview learnings to justify your value proposition and how it changed over the course of the customer discovery process.
- *Final Project Deliverable (10% of grade)*. At the end of the semester, you will present a poster about your technology, its potential impact, and the changes you made to your initial solution over the course of the semester. You will also need to identify potential earlyvangelists, describe your get-keep-grow strategies for customer acquisition, and .
- *Group Contract and Performance (5% of grade)*. At the beginning of the project, you will need to submit a group contract (2% of grade) laying out expectations for how your group will work together. At the end of the semester, you will need to submit a team evaluation (3% of grade) for how you all met the expectations laid out in the contract.

By default, the grade for the final project deliverable will be shared by all members of the group. If a team member does not contribute, please reach out to me to discuss next steps and resolution.

### Academic Misconduct

"It is the responsibility of the Committee on Academic Misconduct to investigate or establish procedures for the investigation of all reported cases of student academic misconduct. The term "academic misconduct" includes all forms of student academic misconduct wherever committed; illustrated by, but not limited to, cases of plagiarism and dishonest practices in connection with examinations. Instructors shall report all instances of alleged academic misconduct to the committee (Faculty Rule 3335-5-487). For additional information, see the Code of Student Conduct. <http://studentconduct.osu.edu/page.asp?id=1>; <http://studentlife.osu.edu/csc/>."

### Disability Services

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. You are also welcome to register with Student Life Disability Services to establish reasonable accommodations. After registration, make arrangements with me as soon as possible to discuss your accommodations so that they may be implemented in a timely fashion. SLDS contact information: [slds@osu.edu](mailto:slds@osu.edu); 614-292-3307; [slds.osu.edu](http://slds.osu.edu); 098 Baker Hall, 113 W. 12<sup>th</sup> Avenue.

### Health and safety requirements

All students, faculty and staff are required to comply with and stay up to date on all university safety and health guidance (<https://safeandhealthy.osu.edu>), which includes wearing a face mask in any indoor space and maintaining a safe physical distance at all times. Non-compliance will be warned first and disciplinary actions will be taken for repeated offenses.



### Copyright disclaimer

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.

### ABET Outcomes

This course contributes, in whole or in part, to several ABET outcomes, including:

2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, environmental, and economic factors
4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives

These outcomes correspond to Goals B and D for this course.

### Sustainability General Education Theme

This course has been designed to align with the requirements of the Sustainability GE Theme. The GE Theme ELOs and the corresponding course ELOs, weeks where covered, and assessment activities are:

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

Sustainability ELO	Course ELO	Weeks	Assessment Activities
1.1 <i>Engage in critical and logical thinking about the topic or idea of the theme.</i>	A.1-A.4, D.1-D.3	1-15	Reflections, Quizzes, Solution Proposal
1.2 <i>Engage in an advanced, in-depth, scholarly exploration of the topic or idea of the theme.</i>	A.1-A.4, D.1-D.3	1-4, 10-12	Reflections, Quizzes, Solution Proposal

The above table lays out how this course meets and assesses the outcomes associated with this Goal.

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 anticipated doing in future.

Sustainability ELO	Course ELO	Weeks	Assessment Activities
2.1 <i>Identify, describe, and synthesize approaches or experiences as they apply to the theme.</i>	B.1, B.4, E.4-E.5	2, 4, 10	Reflections, Solution Proposal
2.2 <i>Demonstrate a developing sense of self a learner through reflection, self-assessment, and creative work, building on prior experiences to respond to new and challenging contexts.</i>	B.3, C.1-C.3, E.1-E.5	9, 13-15	Reflections, Revised VPD, Final Project Deliverable

The above table lays out how this course meets and assesses the outcomes associated with this Goal.

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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.

Sustainability ELO	Course ELO	Weeks	Assessment Activities
3.1 <i>Describe elements of the fundamental dependence of humans on Earth and environmental systems, and on the resilience of these systems.</i>	A.1-A.4	1-4, 10	Reflections, Quizzes, Solution Proposal
3.2 <i>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.</i>	A.1-A.4, D.1-D.3	1-4	Reflections, Quizzes, Final Project Deliverable
3.3. <i>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.</i>	B.1-B.4, C.1-C3, D.1-D.5	5-15	Course Project, Reflections

The above table lays out how this course meets and assesses the outcomes associated with this Goal.

This course also meets the expectations laid out for a high-impact Research & Creative Inquiry GE course. This is done through: (1) the completion of a course-length project in which students research and develop a solution to a sustainability challenge, (2) interact with the teaching team and each other through routine presentations during the lab session to provide meaningful faculty mentoring and peer support, (3) a scaffolded approach in which students receive timely and constructive feedback on their customer discovery interview protocols and lean launchpad documents, (4) routine structured reflection assignments, (5) opportunities to interact with real-world stakeholders to understand how their project fits into the broader context, (6) a public demonstration of a poster to present their work and celebrate their successes over the course of the semester, (7) an explicit requirement to put themselves in the shoes of stakeholders while developing their value proposition diagram, and (8) training on team dynamics and how to work effectively on team projects.

# GE Theme course submission worksheet: Sustainability

## Overview

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Courses in the GE Themes aim to provide students with opportunities to explore big picture ideas and problems within the specific practice and expertise of a discipline or department. Although many Theme courses serve within disciplinary majors or minors, by requesting inclusion in the General Education, programs are committing to the incorporation of the goals of the focal theme and the success and participation of students from outside of their program.

Each category of the GE has specific learning goals and Expected Learning Outcomes (ELOs) that connect to the big picture goals of the program. ELOs describe the knowledge or skills students should have by the end of the course. Courses in the GE Themes must meet the ELOs common for **all** GE Themes and those specific to the Theme, in addition to any ELOs the instructor has developed specific to that course. All courses in the GE must indicate that they are part of the GE and include the Goals and ELOs of their GE category on their syllabus.

The prompts in this form elicit information about how this course meets the expectations of the GE Themes. The form will be reviewed by a group of content experts (the Theme Advisory) and by a group of curriculum experts (the Theme Panel), with the latter having responsibility for the ELOs and Goals common to all themes (those things that make a course appropriate for the GE Themes) and the former having responsibility for the ELOs and Goals specific to the topic of **this** Theme.

## Briefly describe how this course connects to or exemplifies the concept of this Theme (Sustainability)

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In a sentence or two, explain how this class “fits” within the focal Theme. This will help reviewers understand the intended frame of reference for the course-specific activities described below.

*(enter text here)*

This class discusses environmental impacts of the technosphere (with a focus on a specific rotating challenge introduced in Week 4 of the class) and the role of technologists in addressing these impacts. Students are also introduced to techniques to understand the needs of customers in evaluating the suitability of technology and how to bring new, innovative technologies to market to reduce the impact of on-going human activities or to repair past harms.

## Connect this course to the Goals and ELOs shared by *all* Themes

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Below are the Goals and ELOs common to all Themes. In the accompanying table, for each ELO, describe the activities (discussions, readings, lectures, assignments) that provide opportunities for students to achieve those outcomes. The answer should be concise and use language accessible to colleagues outside of the submitting department or discipline. The specifics of the activities matter—listing “readings” without a reference to the topic of those readings will not allow the reviewers to understand how the ELO will be met. However, the panel evaluating the fit of the course to the Theme will review this form in conjunction with the syllabus, so if readings, lecture/discussion topics, or other specifics are provided on the syllabus, it is not necessary to reiterate them within this form. The ELOs are expected to vary in their “coverage” in terms of number of activities or emphasis within the course. Examples from successful courses are shared on the next page.

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

**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.

	Course activities and assignments to meet these ELOs
<p><b>ELO 1.1</b> Engage in critical and logical thinking.</p>	<p>Throughout the course, students will be challenged to think deeply about sustainability challenges and reject simple technical solutions in lecture and readings and as the students engage in the semester-long projects.</p> <p><u>Lecture and Readings:</u> Students will be exposed to the concepts necessary to engage in critical thinking about technical solutions to sustainability challenges as well as to think critically about the market need for new technologies. The relevant readings for the course will cover the principles of environmental science necessary to understand the fundamental mechanics of human activity on the environment, the grand challenges of sustainability, and in-depth readings specific to the social, environmental, and technical elements of the sustainability challenge being addressed throughout the Course (and introduced in Week 4).</p> <p><u>Semester-Long Project:</u> Students will think critically as they evaluate their ideas, what they hear from potential stakeholders during the customer discovery interviews, and in response to presentations from other groups.</p> <p><u>Assessment Strategy:</u> Student achievement of this learning objective will be assessed using several of the documents during the semester-long project (e.g., critical thinking about their solution in the solution proposal, critical thinking about the customer discovery interviews in their canvas documents), through guided reflection questions designed to have them reflect on their thinking process, and through weekly quizzes about the topics discussed throughout the semester.</p>
<p><b>ELO 1.2</b> Engage in an advanced, in-depth, scholarly exploration of the topic or ideas within this theme.</p>	<p>Throughout the course, students will engage in in-depth study on a sustainability challenge (that changes from offering-to-offering, example challenges include decarbonizing energy for transportation, reducing water use in industrial processes in the state of Ohio, improving recycling rates for materials). This in-depth study will be done through a combination of lectures and readings and an in-class project to develop a</p>

	<p>solution to a sustainability challenge:  <u>Lectures and Readings:</u> In weeks 1-4 of the class, students will be introduced to the environmental sciences and engineering that govern the mechanics of the challenge (e.g., the mechanics of global warming and energy use for the decarbonization challenge). This will be done in-class through lectures and readings from the textbook, other peer-reviewed sources, and documents written towards a professional audience in this space (e.g., <i>The Grand Challenges in Environmental Engineering</i> report from the National Academies). In weeks 10-12, students will be introduced to the concepts of life-cycle thinking and environmental life-cycle assessment as they engage in activities to quantify the environmental consequences of their solution using relevant readings from the textbook and other online textbooks for life-cycle assessment. Students will also engage in the limitations and motivations of these approaches, through first-hand experience performing them and readings on the controversial usages of these techniques.  <u>Semester-Long Project:</u> In the semester-long project, students will conduct independent research on the sustainability challenge, develop a solution to an element of the challenge, and understand the mechanisms by which their solution reduces environmental impacts.  <u>Assessment Strategy:</u> Student achievement of this learning objective will be assessed using their semester-long project solution proposal document (where they will describe their mechanisms), guided reflection prompts to think about the process of exploring this challenge, and through the weekly quizzes in weeks 2, 3, 4, 10, 11, and 12.</p>
<p><b>ELO 2.1</b> Identify, describe, and synthesize approaches or experiences.</p>	<p>Throughout the course, students will learn about several metrics commonly used to quantify the environmental impacts of human activities and synthesize them with customer discovery approaches. This will be done through a combination of lectures and readings, in-class activities, and semester long projects built around the sustainability challenge for the course:  <u>Lectures and Readings:</u> In weeks 2, 4, and 10, students will be learning about grand challenges in sustainability, the particulars of the specific sustainability challenge tackled in our class, and sustainability metrics. Students will learn about these through lectures on these topics and readings for these topics from the course textbook and other reference materials. Students will also be tasked with conducting research as part of their group on these challenges and synthesize that with the other concepts they have learned in class.  <u>In-Class Activities:</u> As part of Week 4 and Week 10 activities, students will develop concept maps (using Jamboard or Miro board software), linking, comparing, and contrasting the sustainability challenge that is the focus of the class with the other grand challenges discussed in Week 2 (in Week 4) and comparing and contrasting different approaches to developing quantitatively assessing sustainability (in Week 10)  <u>Semester-Long Project:</u> As part of the semester-long project, students will be tasked to synthesize their in-class experiences, experiences developing a solution to the sustainability challenge, and learnings from customer discovery interviews in order to develop, present, and defend their solution to the sustainability challenge.  <u>Assessment Strategy:</u> Student achievement of this learning objective will be assessed using their semester-long project canvas documents (where they will synthesize their learnings</p>

	<p>from interviews) and final deliverable where they will present on the impact of their proposed solution using quantified metrics for sustainability and learnings from interviews, guided reflection prompts to think about the process of exploring this challenge, and through many of the weekly quizzes where they will be assessed on different approaches to the sustainability challenge and measuring environmental impact.</p>
<p><b>ELO 2.2</b> 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.</p>	<p>Throughout the course, students will engage in creative inquiry and reflection around the semester-long project.</p> <p><u>Semester-Long Project:</u> As part of the semester-long project, students will be tasked to develop a creative solution to the focal sustainability challenge using the customer discovery framework of the Lean Launchpad. This approach requires a participant to constantly reflect on their initial ideas of what customers need from their proposed solution, change their hypotheses when customers disprove student initial thoughts, and reflect on the process of doing customer discovery with a beginners' mind.</p> <p><u>Assessment Strategy:</u> Student achievement of this learning objective will be assessed using several components of their semester-long project, including: (1) their revised value proposition diagram in which students have reflected on and changed their initial VPD based on learnings from the customer discovery interviews, (2) their final project poster presentation where they will be assessed on how their solution fits the market needs and reflects changes made in response to these learnings, and through (3) regular guided reflections to think about the process of doing and learning from stakeholders.</p>

Example responses for proposals within "Citizenship" (from Sociology 3200, Comm 2850, French 2803):

<p><b>ELO 1.1</b> Engage in critical and logical thinking.</p>	<p><i>This course will build skills needed to engage in critical and logical thinking about immigration and immigration related policy through:</i></p> <p><i>Weekly reading response papers which require the students to synthesize and critically evaluate cutting-edge scholarship on immigration;</i></p> <p><i>Engagement in class-based discussion and debates on immigration-related topics using evidence-based logical reasoning to evaluate policy positions;</i></p> <p><i>Completion of an assignment which build skills in analyzing empirical data on immigration (Assignment #1)</i></p>
	<p><i>Completion 3 assignments which build skills in connecting individual experiences with broader population-based patterns (Assignments #1, #2, #3)</i></p> <p><i>Completion of 3 quizzes in which students demonstrate comprehension of the course readings and materials.</i></p>

<p><b>ELO 2.1</b> Identify, describe, and synthesize approaches or experiences.</p>	<p>Students engage in advanced exploration of each module topic through a combination of lectures, readings, and discussions.</p> <p><u>Lecture</u> Course materials come from a variety of sources to help students engage in the relationship between media and citizenship at an advanced level. Each of the 12 modules has 3-4 lectures that contain information from both peer-reviewed and popular sources. Additionally, each module has at least one guest lecture from an expert in that topic to increase students' access to people with expertise in a variety of areas.</p> <p><u>Reading</u> The textbook for this course provides background information on each topic and corresponds to the lectures. Students also take some control over their own learning by choosing at least one peer-reviewed article and at least one newspaper article from outside the class materials to read and include in their weekly discussion posts.</p> <p><u>Discussions</u> Students do weekly discussions and are given flexibility in their topic choices in order to allow them to take some control over their education. They are also asked to provide information from sources they've found outside the lecture materials. In this way, they are able to explore areas of particular interest to them and practice the skills they will need to gather information about current events, analyze this information, and communicate it with others.</p> <p><i>Activity Example: Civility impacts citizenship behaviors in many ways. Students are asked to choose a TED talk from a provided list (or choose another speech of their interest) and summarize and evaluate what it says about the relationship between civility and citizenship. Examples of Ted Talks on the list include Steven Petrow on the difference between being polite and being civil, Chimamanda Ngozi Adichie's talk on how a single story can perpetuate stereotypes, and Claire Wardle's talk on how diversity can enhance citizenship.</i></p>
<p><b>ELO 2.2</b> 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.</p>	<p>Students will conduct research on a specific event or site in Paris not already discussed in depth in class. Students will submit a 300-word abstract of their topic and a bibliography of at least five reputable academic and mainstream sources. At the end of the semester they will submit a 5-page research paper and present their findings in a 10-minute oral and visual presentation in a small-group setting in Zoom.</p> <p>Some examples of events and sites: The Paris Commune, an 1871 socialist uprising violently squelched by conservative forces</p>
	<p>Jazz-Age Montmartre, where a small community of African-Americans—including actress and singer Josephine Baker, who was just inducted into the French Pantheon—settled and worked after World War I. The Vélodrome d'hiver Roundup, 16-17 July 1942, when 13,000 Jews were rounded up by Paris police before being sent to concentration camps The Marais, a vibrant Paris neighborhood inhabited over the centuries by aristocrats, then Jews, then the LGBTQ+ community, among other groups.</p>

## Goals and ELOs unique to Sustainability

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Below are the Goals and ELOs specific to this Theme. As above, in the accompanying Table, for each ELO, describe the activities (discussions, readings, lectures, assignments) that provide opportunities for students to achieve those outcomes. The answer should be concise and use language accessible to colleagues outside of the submitting department or discipline. The ELOs are expected to vary in their “coverage” in terms of number of activities or emphasis within the course. Examples from successful courses are shared on the next page.

**GOAL 3:** 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.

	Course activities and assignments to meet these ELOs
<p><b>ELO 3.1</b> Describe elements of the fundamental dependence of humans on Earth and environmental systems and on the resilience of these systems.</p>	<p>At several points in the course, students will be introduced to the structure of environmental systems, the principles of environmental science that govern their operation, and how human activities impact and rely on these systems. This will be done through lectures and readings.</p> <p><u>Lectures and Readings:</u> In weeks 1-4 of the class, students will be introduced to the environmental sciences and engineering that govern the mechanics of the challenge (e.g., the mechanics of global warming and energy use for the decarbonization challenge). This will be done in-class through lectures and readings from the textbook, other peer-reviewed sources, and documents written towards a professional audience in this space (e.g., <i>The Grand Challenges in Environmental Engineering</i> report from the National Academies). In week 10, students will be introduced to the concepts of life-cycle thinking and environmental life-cycle assessment. Several of the metrics that students will be introduced to in week 10 will be resource consumption metrics, highlighting how human activities rely on resources from the natural environment as inputs.</p> <p><u>Assessment Strategy:</u> Student achievement of this learning objective will be assessed using their semester-long project solution proposal document (where they will describe the mechanisms by which their proposed technical solution interacts with the environment), guided reflection prompts to think about the process of exploring this challenge, and through the weekly quizzes in weeks 2, 3, 4, and 10.</p>
<p><b>ELO 3.2</b> 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.</p>	<p>Early in the course, students will be exposed to the historical impacts that human activity has had on the environment and led to the unsustainability of many human activities (e.g., the use of fossil fuels without carbon capture and sequestration leading to emissions of greenhouse gasses and global warming). Students will also be exposed to several emerging technical solutions to these challenges as part of Week 2 and 4. This will be done through lectures and readings and through the</p>



	<p>semester-long project:</p> <p><u>Lectures and Readings:</u> In weeks 1-4 of the class, students will learn about the relevant history of several elements of the technosphere and their interaction with the ecosphere via resource consumption and pollution emissions. Students will also be exposed to current approaches to qualitatively think about these impacts over the life-cycle of technologies (in week 3) as part of the social and environmental bottom lines. Readings for these topics will come from the textbook and students will be tasked to find a popular press article talking about at least one emerging technology that will be addressed in a reflection prompt.</p> <p><u>Semester-Long Project:</u> In the semester-long project, students will conduct independent research on the sustainability challenge, develop a technical solution to an element of the challenge, and be able to critically identify and discuss both the benefits and the drawbacks of their technical solution for the environment.</p> <p><u>Assessment Strategy:</u> Student achievement of this learning objective will be assessed using their semester-long project final project deliverable (where they will describe the pros and cons of their proposed technology), guided reflection prompts to think about the impacts of existing and emerging technologies, and through the weekly quizzes in weeks 2, 3, and 4.</p>
<p><b>ELO 3.3</b> 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.</p>	<p>Students will be introduced to technical solutions to sustainability challenges, how technology is developed to meet stakeholder and user needs, how to measure the technologies impacts, and how to use stakeholder perspectives and quantifiable sustainable assessment metrics to understand how their proposed technology solution can address sustainability challenges. This will be done through lectures, readings, and the semester-long project.</p> <p><u>Lectures and Readings:</u> In the lectures for weeks 5-9 and 13-15, students will be introduced to the Lean Launchpad framework to understand how stakeholder and user values and needs influence the design and use of technology to address sustainability challenges. Readings on the topics of customer discovery interview process and models will come from the Constable texts, <i>Talking With Humans</i> and <i>Testing With Humans</i>, that discuss how to interview individuals to assess values and needs and use these interviews as evidence in arguments about technology, as well as the Osterwalder text on the development of a business model canvas.</p> <p>In the lectures for weeks 10-12, students will be introduced to several metrics to quantify the environmental impact of their technology. Students are introduced to these metrics to use them as evidence in their semester-long project.</p> <p><u>Semester-Long Project:</u> Over the course of the semester-long project, students will have multiple opportunities to understand the values and stakeholder needs as part of the customer discovery interview process and to quantify the</p>

potential environmental benefits of their process using sustainability metrics.

Assessment Strategy: Students will be assessed on their ability to use evidence of impact (from the sustainability metrics) and user values (from customer discovery interviews) in their canvas documents and in their final poster presentation. Students will also be asked to reflect on the use of these pieces of evidence as part of the guided reflection questions throughout the semester.

# Research & Creative Inquiry 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 Research & Creative Inquiry Courses. It may be helpful to consult the Description & Expectations document for this pedagogical practice or to consult with the OSU Office of Undergraduate Research and Creative Inquiry. You may also want to consult the 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](mailto:daly.66@osu.edu) or call 614-247-8412.

## Pedagogical Practices for Research & Creative Inquiry

Course subject & number

**Performance expectations set at appropriately high levels (e.g. students investigate their own questions or develop their own creative projects).** 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)

## Research & Creative Inquiry Inventory

**Significant investment of time and effort by students over an extended period of time (e.g., scaffolded scientific or creative processes building across the term, including, e.g., reviewing literature, developing methods, collecting data, interpreting or developing a concept or idea into a full-fledged production or artistic work)** 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.** 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)

## Research & Creative Inquiry Inventory

**Students will get frequent, timely, and constructive feedback on their work, iteratively scaffolding research or creative skills in curriculum 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 in which students interpret findings or reflect on creative work.** 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)

Research & Creative Inquiry Inventory

**Opportunities to discover relevance of learning through real-world applications (e.g., mechanism for allowing students to see their focused research question or creative project as part of a larger conceptual framework).** 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 research or display of creative work, or a community scholarship celebration.** 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)

## Research & Creative Inquiry 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 responsible pedagogy).** 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)

## Research & Creative Inquiry Inventory

**Clear plan to market this course to get a wider enrollment of typically underserved populations.**

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)



**From:** [Gingerich, Daniel](#)  
**To:** [Tolchin, Barry S.](#)  
**Subject:** Re: ENVENG 3600 concurrences  
**Date:** Friday, September 08, 2023 3:12:47 PM  
**Attachments:** [image001.png](#)  
[image002.png](#)

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Hi Barry,

Some of this is that I needed to check with Social and Behavioral Science (SBS) and Mathematical and Physical Sciences (MPS) to get this approved since it's a sustainability course (and there are special requirements).

The Dean of Social and Behavioral Sciences over in Arts & Sciences pointed me to Geography as the relevant body for SBS, so the Geography represents that box being checked.

For Mathematical and Physical Sciences, I consulted with the School of Earth Sciences. Their Chair seemed supportive when he forwarded it to his Curriculum Committee members, but they never got back to me with the form. I'm happy to provide that email as evidence.

I'm in a similar boat with the other two units, FABE and AEDE. They were consulted (and I have emails to that fact), but they never responded. Again, I'm happy to provide those emails as evidence.

Daniel



**Daniel B. Gingerich, Ph.D.**

Assistant Professor

**College of Engineering** Department of Civil, Environmental and Geodetic Engineering

**College of Engineering** Department of Integrated Systems Engineering

Core Faculty, The Sustainability Institute

Affiliated Faculty, Translational Data Analytics Institute

221A Bolz Hall, 2036 Neil Ave, Columbus, OH 43210

614-688-1768 Office / 614-292-3780 Fax

[gingerich.62@osu.edu](mailto:gingerich.62@osu.edu) / [ceg.osu.edu](http://ceg.osu.edu)

Pronouns: he/him/his / Honorific: Prof.

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**From:** Tolchin, Barry S. <tolchin.5@osu.edu>

**Date:** Friday, September 8, 2023 at 2:39 PM

**To:** Gingerich, Daniel <gingerich.62@osu.edu>

**Subject:** FW: ENVENG 3600 concurrences

Hello Daniel,

Do you know if the units Rosie mentions were covered in the letters you sent me? If there were other letters I missed, please let me know.

Sincerely,

**Barry Tolchin**

Manager, Academic Advising

**Civil, Environmental, and Geodetic Engineering**

440 Bolz Hall, 2036 Neil Ave., Columbus, OH 43210

(614) 292-5103 Office

[tolchin.5@osu.edu](mailto:tolchin.5@osu.edu)

[ceg.osu.edu](http://ceg.osu.edu)

**Appointments:**

OSU Columbus Campus Students: <https://buckeyes.campus.eab.com/>

All other appointments: [CEGE Appointment Request](#)

Pronouns: he/him/his

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**From:** Quinzon-Bonello, Rosario <quinzon-bonello.1@osu.edu>

**Sent:** Friday, September 8, 2023 1:41 PM

**To:** Tolchin, Barry S. <tolchin.5@osu.edu>

**Subject:** ENVENG 3600 concurrences

Hi Barry –

I see concurrences from CBE EEOB, SENR, GEOG, Moritz, Public Health, CBE for ENVENG 3600

Other requested concurrences listed on the concurrence form but not uploaded to curriculum are:

FABE, AEDE, SBS, MPS

Will these be needed or is the program proceeding without them?

Thanks,

Rosie



**Rosario (Rosie) Quinzon-Bonello, M.Ed.**

Assistant Dean for Curriculum and Assessment

**College of Engineering**

122 Hitchcock Hall, 2070 Neil Ave.

Columbus, OH 43210

[quinzon-bonello.1@osu.edu](mailto:quinzon-bonello.1@osu.edu)

[engineering.osu.edu](http://engineering.osu.edu)

## Ohio State Department Course Review Concurrence Form

The purpose of this form is to provide a simple system of obtaining departmental reactions to proposed new courses, group studies, study tours, workshop requests, and course changes. A letter may be substituted for this form.

Academic units initiating a request which requires such a reaction should complete Section A of this form and send a copy of the form, course request, and syllabus to each of the academic units that might have related interests in the course. Initiating units should allow at least two weeks for responses.

Academic units receiving this form should response to Section B and return the form to the initiating unit. Overlap of course content and other problems should be resolved by the academic units before forwarding this form and all other accompanying documentation to the Office of Academic Affairs.

### A. Information from academic unit *initiating* the request:

Initiating Academic Unit: Civil, Environmental and Geodetic Engineering

Date: 2/17/2023

Registrar's Listing: ENVENG

Course Number: 3600

Level: U  P  G

Credit Hours: 4

Course Title: Technology Innovation for Sustainability

Type of Request:  New Course  Group Studies  Workshop  Study Tour  Course Change

Academic Unit with related interests asked to review the request (use a separate form for each unit while requesting concurrences from multiple units):

CBE, CFAES (FABE, SENR & AEDE), CAS (SBS, MPS, EEOB), Fisher, Moritz, Public Health

Date responses are needed:

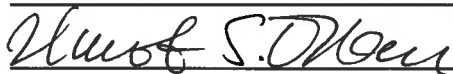
3/6/2023

### B. Information from academic units *reviewing* the request:

- The academic unit **supports** the proposal  
 The academic unit **does not support** the proposal.

Please explain:

The academic unit suggests:



Signature of Department Chair

Signature of Graduate Studies Chair (if applicable)

## Ohio State Department Course Review Concurrence Form

The purpose of this form is to provide a simple system of obtaining departmental reactions to proposed new courses, group studies, study tours, workshop requests, and course changes. A letter may be substituted for this form.

Academic units initiating a request which requires such a reaction should complete Section A of this form and send a copy of the form, course request, and syllabus to each of the academic units that might have related interests in the course. Initiating units should allow at least two weeks for responses.

Academic units receiving this form should respond to Section B and return the form to the initiating unit. Overlap of course content and other problems should be resolved by the academic units before forwarding this form and all other accompanying documentation to the Office of Academic Affairs.

### A. Information from academic unit *initiating* the request:

Initiating Academic Unit: Civil, Environmental and Geodetic Engineering Date: 2/17/2023

Registrar's Listing: ENVENG

Course Number: 3600 Level: U  P  G  Credit Hours: 4

Course Title: Technology Innovation for Sustainability

Type of Request:  New Course  Group Studies  Workshop  Study Tour  Course Change

Academic Unit with related interests asked to review the request (use a separate form for each unit while requesting concurrences from multiple units):

CBE, CFAES (FABE, SENR & AEDE), CAS (SBS, MPS, EEOB), Fisher, Moritz, Public Health  
Date responses are needed:  
3/6/2023

### B. Information from academic units *reviewing* the request:

- The academic unit **supports** the proposal  
 The academic unit **does not support** the proposal.

Please explain:

The academic unit suggests:

Gail L. Kaye, PhD, RD, LPCC, Associate Dean, Undergraduate Programs and Assmt

Signature of Department Chair

Signature of Graduate Studies Chair (if applicable)

**Subject:** Re: New Sustainability Course Concurrence Request out of Engineering  
**Date:** Friday, February 24, 2023 at 10:06:31 AM Eastern Standard Time  
**From:** Ralph, Anne E.  
**To:** Gingerich, Daniel  
**Attachments:** image001.png, image002.png

Daniel,  
Thanks for your email. The College of Law is pleased to grant concurrence. If we can help in other ways, please let me know.  
Best,  
AER



**Anne E. Ralph**  
Morgan E. Shipman Professor in Law & Associate Dean for Academic Affairs  
**Michael E. Moritz College of Law**  
55 West 12th Avenue | Columbus, OH 43210  
614-247-4797 Office | [ralph.52@osu.edu](mailto:ralph.52@osu.edu)  
Pronouns: she/her/hers

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**From:** Gingerich, Daniel <[gingerich.62@osu.edu](mailto:gingerich.62@osu.edu)>  
**Date:** Monday, February 20, 2023 at 3:50 PM  
**To:** Ralph, Anne E. <[ralph.52@osu.edu](mailto:ralph.52@osu.edu)>  
**Subject:** New Sustainability Course Concurrence Request out of Engineering

Dean Ralph,

I am in the process of developing a new 3000-level course in Environmental Engineering on the topic of Technology Innovation and Assessment for Sustainability. Because it is a new course on the topic of sustainability, I am doing the rounds with the colleges that are listed in OAA guidance to check for concurrence, which includes Moritz. For those colleges that don't have separate Departments/Schools/Divisions, I've been reaching out to Associate Deans with curricula in their portfolio to get concurrence, hence why I'm emailing you for this request.

If there is someone else I should reach out to in Moritz, please let me know and I'll be happy to work with them for this.

Please let me know if you have questions, would like more detail, or see potential concerns with the course as envisioned.

Best,

Daniel

**Daniel B. Gingerich, Ph.D.**

Assistant Professor

College of Engineering Department of Civil, Environmental and Geodetic Engineering

College of Engineering Department of Integrated Systems Engineering

Core Faculty, The Sustainability Institute

Affiliated Faculty, Translational Data Analytics Institute

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614-688-1768 Office / 614-292-3780 Fax

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Pronouns: he/him/his / Honorific: Prof.

## Ohio State Department Course Review Concurrence Form

The purpose of this form is to provide a simple system of obtaining departmental reactions to proposed new courses, group studies, study tours, workshop requests, and course changes. A letter may be substituted for this form.

Academic units initiating a request which requires such a reaction should complete Section A of this form and send a copy of the form, course request, and syllabus to each of the academic units that might have related interests in the course. Initiating units should allow at least two weeks for responses.

Academic units receiving this form should response to Section B and return the form to the initiating unit. Overlap of course content and other problems should be resolved by the academic units before forwarding this form and all other accompanying documentation to the Office of Academic Affairs.

### A. Information from academic unit *initiating* the request:

Initiating Academic Unit: Civil, Environmental and Geodetic Engineering

Date: 2/17/2023

Registrar's Listing: ENVENG

Course Number: 3600

Level: U  P  G

Credit Hours: 4

Course Title: Technology Innovation for Sustainability

Type of Request:  New Course  Group Studies  Workshop  Study Tour  Course Change

Academic Unit with related interests asked to review the request (use a separate form for each unit while requesting concurrences from multiple units):

CBE, CFAES (FABE, SENR & AEDE), CAS (SBS, MPS, EEOB), Fisher, Moritz, Public Health

Date responses are needed:

3/6/2023

### B. Information from academic units *reviewing* the request:

- The academic unit **supports** the proposal  
 The academic unit **does not support** the proposal.  
Please explain:

LOOKS LIKE A GREAT CLASS!

The academic unit suggests:

Signature of Department Chair

Signature of Graduate Studies Chair (if applicable)

Mat Coleman  
02/21/23  
GEOGRAPHY

## Ohio State Department Course Review Concurrence Form

The purpose of this form is to provide a simple system of obtaining departmental reactions to proposed new courses, group studies, study tours, workshop requests, and course changes. A letter may be substituted for this form.

Academic units initiating a request which requires such a reaction should complete Section A of this form and send a copy of the form, course request, and syllabus to each of the academic units that might have related interests in the course. Initiating units should allow at least two weeks for responses.

Academic units receiving this form should respond to Section B and return the form to the initiating unit. Overlap of course content and other problems should be resolved by the academic units before forwarding this form and all other accompanying documentation to the Office of Academic Affairs.

### A. Information from academic unit *initiating* the request:

Initiating Academic Unit: Civil, Environmental and Geodetic Engineering Date: 2/17/2023

Registrar's Listing: ENVENG

Course Number: 3600 Level: U  P  G  Credit Hours: 4

Course Title: Technology Innovation for Sustainability

Type of Request:  New Course  Group Studies  Workshop  Study Tour  Course Change

Academic Unit with related interests asked to review the request (use a separate form for each unit while requesting concurrences from multiple units):

CBE, CFAES (FABE, SENR & AEDE), CAS (SBS, MPS, EEOB), Fisher, Moritz, Public Health  
Date responses are needed:  
3/6/2023

### B. Information from academic units *reviewing* the request:

- The academic unit **supports** the proposal  
 The academic unit **does not support** the proposal.

Please explain:

This course has some overlap with ENR 3900, particularly related to LCA, but this course is more math oriented than our offering. Our offering does not attract any EnvEng students. This proposed course might serve as a possible alternative/substitute for our offering of ENR 3900 in some situations.

- The academic unit suggests:

Jeff Sharp, Chair of Academic Affairs

Signature of Department Chair

Signature of Graduate Studies Chair (if applicable)



## Ohio State Department Course Review Concurrence Form

The purpose of this form is to provide a simple system of obtaining departmental reactions to proposed new courses, group studies, study tours, workshop requests, and course changes. A letter may be substituted for this form.

Academic units initiating a request which requires such a reaction should complete Section A of this form and send a copy of the form, course request, and syllabus to each of the academic units that might have related interests in the course. Initiating units should allow at least two weeks for responses.

Academic units receiving this form should respond to Section B and return the form to the initiating unit. Overlap of course content and other problems should be resolved by the academic units before forwarding this form and all other accompanying documentation to the Office of Academic Affairs.

### A. Information from academic unit *initiating* the request:

Initiating Academic Unit: Civil, Environmental and Geodetic Engineering Date: 2/17/2023

Registrar's Listing: ENVENG

Course Number: 3600 Level: U  P  G  Credit Hours: 4

Course Title: Technology Innovation for Sustainability

Type of Request:  New Course  Group Studies  Workshop  Study Tour  Course Change

Academic Unit with related interests asked to review the request (use a separate form for each unit while requesting concurrences from multiple units):

CBE, CFAES (FABE, SENR & AEDE), CAS (SBS, MPS, EEOB), Fisher, Moritz, Public Health  
Date responses are needed:  
3/6/2023

### B. Information from academic units *reviewing* the request:

- The academic unit **supports** the proposal  
 The academic unit **does not support** the proposal.

Please explain:

The academic unit suggests:



Signature of Department Chair

Signature of Graduate Studies Chair (if applicable)

Ian Hamilton, Vice Chair of Undergraduate Studies, EEOB