

Graduate Sustainability Certificate Goals and Objectives

An easy first step in helping the University of Kentucky stand out as a leader in sustainable development research and pedagogy is to create an interdisciplinary graduate certificate. A university-wide certificate will allow existing graduate students as well as professionals seeking continuing education to gain a deeper understanding of the meaning of sustainability, to work across disciplines with experts promoting environmental, economic, and social well-being in a variety of fields, and to incorporate multi-systems thinking into their own research, problem-solving, and professional work. Further, as students increasingly search for programs addressing aspects of sustainability¹, demonstrating a commitment to university-wide collaborative education and research may help with long-term growth, revenue generation, and branding.

What is “sustainability” for the Purpose of a University-Wide Certificate?

Sustainability requires taking approaches that consider a “triple bottom line” of environmental, economic, and social well-being. This is clearly outlined in the United



Nations Sustainable Development Goals, a collection of 17 interrelated targets for creating a more just, prosperous, and healthy world. This strategy to achieving sustainable development translates easily into an outline for a pedagogical approach to sustainability education. For students to be well-

versed in “sustainability” they must understand not only how their own work impacts sustainability, but also on how other fields are advancing the goals as well as the potential catalytic effect of creating strategic research and development partnerships. A graduate certificate could

¹ The Princeton Review's 2017 *College Hopes and Worries Survey Report* asked how much a college's commitment to environmental issues (from academic offerings to practices concerning energy use, recycling, etc.) would contribute to the decision to apply to or attend a school? A majority (64%) of respondents said having information about colleges' commitment to environmental issues would contribute "strongly," "very much," or "somewhat" to their application/attendance decisions. (Up 3% from 2016.) (Princeton Review, 2017. Available at <https://www.princetonreview.com/college-rankings/college-hopes-worries>.)

serve as a pilot program for a future interdisciplinary degree in “sustainability”; however, the merits of a contained sustainability certificate are extensive.

Coursework towards the completion of a graduate sustainability certificate program should address the “triple bottom line,” requiring students take classes from colleges and departments outside their major field of study. The list of approved courses should include representation from all colleges and will require students to think critically and step out of their silo to consider the larger sustainability framework. In 2015, the Tracey Farmer Institute for Sustainability and the Environment compiled a list of sustainability-focused and sustainability-related courses. The list, though not exhaustive, represents the existence of available coursework in multiple disciplines of study. In addition, a 2018 Sustainable Pedagogies Workshop may serve to create benchmarks for course requirements for incorporating sustainability theory and practice.

Benefits of a Graduate Sustainability Certificate

Promote Interdisciplinary Research and Education

Sustainability incorporates many disciplines, methodologies, and institutional practices. Certificate students will acquire knowledge of the multidisciplinary breadth of the field and will gain experience in analyzing real-life problems and with working collaboratively to solve these problems. Certificates create topic-focused programs of study outside of a student’s major degree. The sustainability certificate, as opposed to a traditional minor focusing on a single outside field, would allow students to select coursework that provides them with knowledge on how a variety of disciplines approach sustainable development practices. A Graduate Sustainability Certificate will include courses from across the university. This allows for a more diverse educational background and more experiences to build off of, and addresses professional development needs of individuals in a wide variety of areas from STEM fields, professional fields (e.g. law, business, design, public health), and humanities. This will provide students the vocabulary and foundation to work with those in other fields to create innovative approaches to problems, fostering relationships between students and faculty across disciplines.

Accessibility

A graduate certificate also offers the benefits of access and affordability by creating an alternative to the traditional degree, thereby meeting the growing demand for more specialized programs aligned with specific competencies. According to the Institute for College Access and Success, the number of people who hold post-baccalaureate certificates has increased by more than 50% since 2005 — and the numbers continue to grow. This is because professionals seeking certificates are able to get an immediate return on investment with a smaller commitment and a faster payback. Although not considered a replacement for a degree, certificates allow professionals to learn new skills

to move them ahead in their careers or get them up to speed in a new field. Graduate certificates allow professionals to keep their skills relevant, to gain specialized knowledge, and gauge interest in a field prior to committing to a graduate degree. For those who have already completed a BA, or even some other graduate education, certificates offer professionals flexible learning format at a minimal financial risk.

Employment Benefits

As employers move towards competency-based hiring, seeking to match actual job requirements to candidates' abilities, those versed in sustainability will have a basic understanding of theories and skills outside of their chosen discipline. Students and professionals able to communicate and function outside of their specific field of practice will have a larger selection of employment opportunities and be better

Sustainability is an incredibly diverse, multidisciplinary field encompassing a variety of professionals. Although “sustainability” may not be in their job descriptions, sustainability professionals can be business managers, distribution managers, production managers, accountants, compliance officers, and more, according to the Bureau of Labor Statistics. It is increasingly becoming a critical part of business strategy and operations. Nearly every Fortune 500 company has made commitments to sustainability efforts, and a 2014 McKinsey Global Institute survey found that 43% of executives indicated their company’s desire to align sustainability with business goals, missions, and values. (McKinsey Global Institute, “Sustainability’s strategic worth: McKinsey Global Survey results,” 2014.) This is in part because there is a significant financial benefit to implementing sustainability practices. Companies will, therefore, need qualified professionals armed with the skills to advance the cause of sustainability.

Creating a graduate certificate in sustainability also allows UK to better align with workforce needs, helping students prepare for employment upon graduation and aligning their skills with what employers actually want. Students well-versed in sustainability are able to apply systems thinking, implement and manage sustainable development practices, meet the triple bottom line, and promote sustainable strategies inside organizations and beyond. This will give students a competitive advantage in the job market.

Learning Objectives/Outcomes

Students completing a graduate certificate in sustainability will be able to:

- Identify, critically analyze, and propose solutions to the environmental, social, and economic dimensions of sustainability;
- Engage in systems thinking and practice so as to address the interrelationships among the three dimensions of sustainability, and
- Understand how theory, practice, and reflection on environmental, economic, and social well-being are integrated in the pursuit of a more sustainable world.

UNESCO has also created a list of learning outcomes to address the 2030 UN Sustainable Development Goals.

UNESCO	http://unesdoc.unesco.org/images/0024/002474/247444e.pdf	UNESCO has created a series of learning outcomes to assess teaching on the 17 Sustainable Development Goals. They are represented by cognitive learning objectives,
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Potential Course Requirements

Courses listed as meeting the requirements for the certificate must be approved by an Advisory Board. Submissions to the Board should include:

- A course syllabus that includes sustainability in its course description, includes at least two of the three pillars of sustainability in its course goals, and provides evidence that these concerns are addressed in class discussions, readings, or exercises.
- A brief narrative explaining how the course addresses sustainability and how the course would be a valuable addition to the certificate's plan of study. Courses approved for the certificate should be offered at least every other year.
- Any additional materials helpful to the committee in making decisions including, but not limited to a description of course readings and their relation to sustainability or a sample lesson/assignment.

If there is a desire to eventually offer a series of specializations within the certificate, an excellent example can be seen within the [Harvard Extension Certificate Program](#), which offers specialties in Green Building and Community Sustainability Certificate, Environmental Policy and International Development Certificate, Natural Resource Management and Sustainable Ecosystems Certificate, and its Generally Sustainability Certificate. If specialties are offered, it should be a mission of the program to maintain the interdisciplinary nature of sustainability studies. This might be accomplished by limiting the number of courses students may take in a single department or college.

Advisory Board

The existing Faculty Sustainability Council could serve as an advisory board for the Graduate Certificate. This could involve creating a set of learning objectives/outcomes to assess potential courses for inclusion in the certificate, reviewing and approving such courses, evaluating the program and its ability to meeting the learning objectives, and reviewing and amending the objectives and courses as appropriate.

Existing UK Graduate Certificates

Unlike existing certificates at UK, the proposed graduate certificate in sustainability is completely interdisciplinary. Students *must* select from a range of courses that touch on each of the three pillars of sustainable development: environmental, economic, and social well-being and must complete a capstone project that falls within required parameters set by an Advisory Board. **MORE INFORMATION NEEDED ON EXISTING GRADUATE CERTIFICATES**

How UK Benchmark Institutions Address Sustainability

The University of Michigan's Graduate Certificate provides the best model for an equivalent program at UK; however, the structure of the [University of Wisconsin-Madison](#) and [University of Iowa](#) undergraduate certificate programs have incorporated excellent learning objectives and program structures as well.

[University of Michigan-Ann Arbor](#)

The University offers more than 700 courses that address sustainability. Students can choose from more than 10 undergraduate degrees, a dozen master's degrees, and 15 doctoral programs related to sustainability—as well as a wide variety of minors, concentrations, dual-major programs, and certificate options. The institution also offers a [Graduate Certificate in Sustainability](#) through the School for Environment and Sustainability. The Sustainability Graduate Certificate is open to students enrolled in any University of Michigan graduate program. The certificate requires six credits of coursework in fundamental knowledge, six credits of coursework in skill development and a capstone experience, which may entail an additional 3-credit course or an approved co-curricular experiential activity. The Sustainability Knowledge Fundamentals portion focuses on foundational theory and background within a specific topic, including courses in the principles of sustainability, ethics, behavior, education, biodiversity conservation, policy, law, or other sustainability-themed courses that look at case studies. Skill Set Development courses focus on developing techniques and tools of analysis, intervention or design principles, and generally often incorporate problem sets, laboratory or field-based components, design projects, mock negotiations, or other experiences directly related to skill development. Courses are related to modeling, mapping, design, policy-making, behavior change, analytical problem solving, and otherwise acquiring experience applying different tools or techniques.

[UC Davis](#)

The University offers numerous courses that address sustainability at the graduate and undergraduate levels, which have been curated for students to pick from as part of the institution's 2010 Climate Action Plan. Students also have an opportunity to take part in an

Education for Sustainability Program - a seminar focused on 1) interdisciplinary lectures addressing principles of sustainability and 2) applying them to daily life. Students in this program may also participate in an Action Research Team project. Various research groups on agricultural sustainability, energy efficiency, environmental studies, and transportation provide sustainability-focused programs (only one supporting a major in Sustainable Agriculture and Food Systems). UC Davis Extension and its Center for Entrepreneurship also offer a series of professional and continuing education certificates relating to energy efficiency, sustainable building design, and green entrepreneurship.

[University of Iowa](#)

Iowa offers a certificate in sustainability to undergraduate students and post-baccalaureate students not enrolled in graduate or professional programs. This 24 semester-hour certificate draws from multiple disciplines to provide knowledge and skills necessary for contributing to the development of sustainable systems. No more than three courses may be taken in a single department. According to the University, certificate students will “enhance their preparation for a variety of vocations such as researcher, corporate officer, technology specialist, farmer, government official, and grassroots advocate.” The certificate is overseen by a nine-person advisory board.

[Michigan State University](#)

Michigan State has multiple degrees, minors, and specializations addressing sustainability including an MA and PhD in Community Sustainability, BA in Environmental Studies and Sustainability, and a BA, MA, and PhD in Sustainable Parks Recreation and Tourism/ Sustainable Tourism and Protected Area Management. The University has undergraduate minors in Environmental and Sustainability Studies, Sustainable, Agriculture and Food Systems, Sustainable Natural Resource Recreation Management, and The City: Environment, Design, and Society. It additionally has a graduate specialization in Business Concepts for Environmental Sustainability and Conservation. There are no certificates in sustainability.

[University of Missouri- Columbia](#)

The institution has a BS in Sustainable Agriculture and the College of Engineering has a mission in sustainability in food, energy, water, and sustainable cities.

[University of Arizona](#)

Sustainability at the University of Arizona is evident extensively across the campus. The institution has undergraduate degrees in Sustainable Built Environments, General, Sustainable Built Environments, Heritage Conservation Emphasis, Sustainable Built Environments: Sustainable Buildings Emphasis, Sustainable Built Environments:

Sustainable Communities Emphasis, Sustainable Built Environments: Sustainable Landscapes Emphasis, Sustainable Plant Systems: Agronomy, Sustainable Plant Systems: Controlled Environment Agriculture Emphasis, and Sustainable Plant Systems: Environmental Horticulture. Additionally 36 of the University's graduate programs in STEM fields, education, design, public policy, and planning emphasize sustainability in their degree descriptions. There are two certificates (Aquaculture and Heritage Conservation) that address sustainability; however, there is no sustainability certificate.

[University of Minnesota-Twin Cities](#)

The institution has an undergraduate Sustainability Studies Minor that is open to all undergraduates and addresses the ecological, social, ethical, political, and economic forces impacting human society and the natural environment. An introductory core course provides students an overview of models for understanding sustainability using case studies to illustrate the challenges of sustainability in practice. Students choose additional electives from multidisciplinary courses with perspectives related to sustainability. Finally, a capstone project requires students to synthesize and apply knowledge to actual sustainability problems. Students complete 6 credits of required courses for the core and the capstone, and 9-12 restricted electives, for a total of 15-18 credits. There are also undergraduate degrees in Sustainable Agriculture Minor and Sustainable Systems Management.

[The Ohio State University](#)

The institution offers 340 courses that focus specifically on sustainability issues and over 700 additional courses that feature sustainability topics. The university also offers a major in [Environment, Economy, Development and Sustainability](#) and many colleges offer minors with a sustainability focus. There is no graduate certificate focused specifically on sustainability.

[University of Wisconsin-Madison](#)

The institution has a 12 credit undergraduate certificate in sustainability that helps students develop literacy in environmental, social, and economic dimensions of sustainability, as well its inherent systems nature. Students must complete courses approved for each of the above four dimensions of sustainability and must complete an additional community engagement requirement.

[University of North Carolina, Chapel Hill](#)

The institution's 12 credit undergraduate certificate provides an understanding of sustainability utilizing a "unifying approach" to human and environmental problems. Courses in the program include a variety of classes in STEM fields, policy and advocacy,

planning, business, and others. One clear limitation of the program is that students who major in the B.A. or B.S. environmental degree programs are not allowed to minor in sustainability studies.

[University of Florida](#)

The University of Florida has several [undergraduate and graduate degree programs](#) in sustainability. The institution also offers graduate certificates in Sustainable Agroecosystems, Sustainable Construction, Sustainable Engineering, Sustainable Land Resource and Nutrient Management, and Sustainable Development Practice. There is no general graduate certificate in sustainability.

How Other Institutions are Addressing Sustainability Education

Programs at institutions other than the UK Benchmark Universities offer a variety of certificates, courses, and even university-wide learning outcomes relating to sustainability or sustainable development. The best of these programs incorporates holistic or systemic thinking and interdisciplinary/trans-disciplinary teaching and research. There is an emphasis on applied learning, community outreach, evidence-based learning, and on changing attitudes and values. This is reflected in learning outcomes that are broken down into knowledge and skills, application in academic/professional career, and personal values. Although the goal of these programs is to create students that are “agents of change”, it is not uncommon for these programs to take a more superficial look at sustainability (e.g. recycling, consumption, etc.), considering only environmental issues rather than considering the triple bottom line.

Examples of Other Institutions' Learning Outcomes

Institution	Link	Themes
Cal Poly (University-wide)	https://academicprograms.calpoly.edu/content/academicpolicies/sustainability_lo	<p>In 2004, President signed Talloires Declaration, a 10-point action plan. committing institution to sustainability and environmental literacy in teaching, theory, and practice.</p> <ul style="list-style-type: none"> • Define and apply sustainability principles within their academic programs • Explain how natural, economic, and social systems interact to foster or prevent sustainability • Analyze and explain local, national, and global sustainability using a multidisciplinary approach • Consider sustainability principles while developing personal and professional values
University of Illinois (University-wide)	https://icap.sustainability.illinois.edu/project/develop-sustainability-learning-outcomes	<p>As part of campus vision, the University has pledge that students will graduate with following competencies:</p> <p><i>Sustainability in day-to-day life:</i></p> <ul style="list-style-type: none"> • Students will learn ways in which natural resources are used to produce what they consume, such as the food they eat, the water they drink, and the energy they use. • Students will understand ways in which their lifestyles and well-being are interconnected with those of diverse producers and consumers around the world, including impoverished communities. <p><i>Sustainability knowledge and skills</i></p> <ul style="list-style-type: none"> • Students will learn core concepts of ecology and develop skills relevant to their chosen fields to provide a basis for environmental sustainability. • Students will learn to think holistically about sustainability using perspectives across multiple disciplines. <p><i>Sustainability as Personal Vision</i></p> <ul style="list-style-type: none"> • Students will understand relationships between global environmental and economic trends and their impact on diverse cultures and communities. • Students will develop an integrated vision for sustainability that embraces their personal lives, professions, local communities, and the world-at-large.
Appalachian State University (Department)	<p>https://sd.appstate.edu/student-learning-outcomes</p> <p>https://sd.appstate.edu/sites/sd.appstate.edu/files/sd_student_learning_goals_outcomes.pdf</p>	<ul style="list-style-type: none"> • Goal I. Identify and critically analyze the social, environmental, and economic dimensions of sustainability • Goal II. Develop a capacity for integrative thinking and practice • Goal III. Integrate theory, practice, and reflection in the pursuit of a more sustainable world

Portland State (University-wide)	https://www.pdx.edu/institutional-assessment-council/campus-wide-learning-outcomes	Sustainability: Students will identify, act on, and evaluate their professional and personal actions with the knowledge and appreciation of interconnections among economic, environmental, and social perspectives in order to create a more sustainable future.
University of Vermont (General Ed Requirement)	http://gened-sustainability.wikispaces.com/SLO7Apr2014	<ul style="list-style-type: none"> • Students can have an informed conversation about the multiple dimensions and complexity of sustainability. (knowledge category) • Students can evaluate sustainability using an evidence-based disciplinary approach and integrate economic, ecological, and social perspectives. (skills category) • Students think critically about sustainability across a diversity of cultural values and across multiple scales of relevance from local to global. (values category) Students, as members of society, can recognize and assess how sustainability impacts their lives and how their actions impact sustainability. (personal domain)
University of Utah (University-Wide)	https://sustainability.utah.edu/education/faculty-resources/learning-outcomes/ https://sustainability.utah.edu/wp-content/uploads/sites/19/2018/03/learning-outcomes_sustainability.pdf	<p>Each department and program on campus has the opportunity to work with the sustainability education team to:</p> <ul style="list-style-type: none"> • Submit existing departmental learning outcomes • Outline applicable required courses that include sustainability concepts • Re-craft learning outcomes that articulate their discipline's contribution to sustainability at the U of U. See examples here.
University of Iowa (undergraduate certificate)	https://sustainability.uiowa.edu/assets/Uploads/Sustainability-Certificate-Rack-Card.pdf https://sustainability.uiowa.edu/teaching-and-research/certificate-for-faculty/	<p>Courses included in the certificate must include the following: Please include a syllabus that includes the topic of sustainability in its course description and includes at least two of the three intersecting concerns of sustainability in its course goals and evidence that these concerns are addressed in class discussions, readings, or exercises. Those intersecting concerns are environmental integrity, economic viability, and social justice.</p>

<p>Harvard Extension (certificate)</p>	<p>https://www.extension.harvard.edu/academics/professional-graduate-certificates/sustainability-certificate</p>	<ul style="list-style-type: none"> • Understand the benefits of conventional and renewable energy systems; issues surrounding new transportation technologies; energy intensity of food production; effects of supply chain management and international commerce in energy security, energy management in buildings; and mechanisms needed to evolve into sustainable energy operations. • Implement sustainability management at the nexus of a local business, local government, and community, as well as use management systems and performance frameworks. • Leverage their knowledge of focused subject areas—such as environmental economics, greenhouse emissions management, sustainable building design, sustainable supply chain management, environmental toxicology, or risk management—to achieve a specific objective.
<p>The Ohio State University</p>	<p>https://www.osu.edu/assets/pdf/sustainability/sustainabilitygoals.pdf</p>	<ul style="list-style-type: none"> • Deliver a Curriculum that provides Ohio State students at all stages of instruction – from General Education to professional and technical programs – with opportunities to understand sustainability holistically, framed by the environment, science, technology, society, the economy, history, culture, and politics. • Address the Complexities of Sustainability through a variety of learning formats, strategies, and occasions. <p>Research and Innovation</p> <ul style="list-style-type: none"> • Reward Sustainability Scholarship, including the scholarship of engagement, by providing incentives for students, faculty and staff to make discoveries and stimulate creative efforts that promote and achieve sustainability. • Magnify Sustainability Scholarly Output and Impact to create new knowledge, solve real world problems, including for our own operations, and increase Ohio State’s national/international reputation as a sustainability research leader.

Additional Resources

Designing and Assessing Learning Outcomes: A Framework for Co-Curricular Sustainability Programs, Heather Spalding, Dilafruz Williams and Vicki Wise
http://www.susted.com/wordpress/content/designing-and-assessing-learning-outcomes-a-framework-for-co-curricular-sustainability-programs_2014_06/

Constructing and Assessing an Introductory Urban Sustainability Course: Applying New Insights Using Survey Research, Chad Paul Frederick and K. David Pijawka
http://www.susted.com/wordpress/content/constructing-and-assessing-an-introductory-urban-sustainability-course-applying-new-insights-using-survey-research_2014_12/

Sustainability in higher education courses: Multiple learning outcomes, Keren Mintz and Tali Tal
<https://www.sciencedirect.com/science/article/pii/S0191491X13000655>

Vignette question design for the assessment of graduate sustainability learning outcomes
<https://www.tandfonline.com/doi/abs/10.1080/13504622.2016.1263280?journalCode=ceer20>

Higher education for sustainability: seeking affective learning outcomes, Kerry Shephard
https://agsci.oregonstate.edu/sites/agscid7/files/higher_education_for_sustainability_seeking_affective_learning_outcomes.pdf

[Learning Outcomes for Sustainable Development in Higher Education https://www.researchgate.net/publication/228358064_Learning_Outcomes_for_Sustainable_Development_in_Higher_Education](https://www.researchgate.net/publication/228358064_Learning_Outcomes_for_Sustainable_Development_in_Higher_Education)