Sustainability

Sustainability seeks a way for human and natural systems to work together so that all species can survive and thrive over the long term, both locally and globally. The Bachelor of Science in Sustainability provides the broad fundamental knowledge, skills and competencies needed to drive sustainable outcomes that address today’s urgent environmental, economic and social challenges. This degree can be applied across a wide range of fields, from management, design and planning to environmental services in business, nonprofit and public institutions.

Required core courses provide a foundation in sustainability principles and strategies, applications in practice, environmental science, environmental law and policy, sustainability businesses, and systems thinking, culminating in an independent capstone project. Electives are drawn from a range of courses in Arts & Sciences that reflect the breadth of sustainability applications. Faculty are educators and practitioners with deep knowledge of and experience in the application of sustainability. The program addresses the collaborative and integrative nature of sustainability with an emphasis on applied learning, which takes these lessons from the classroom into the St. Louis community.

Students each this degree by completing 18 units of core requirements and 18 additional units. Students may choose from three concentrations or select electives tailored to their interests. The concentration options are as follows:

- **Sustainable Environment and Science**, with a focus on the environmental aspects of sustainability
- **Sustainable Management and Organizations**, with a focus on understanding and applying sustainability in corporate and institutional management
- **Urban Sustainability**, with a focus on urban-scale sustainability policies and programs

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Website: [http://ucollege.wustl.edu/programs/undergraduate/bachelors/sustainability](http://ucollege.wustl.edu/programs/undergraduate/bachelors/sustainability)

### Degree Requirements

#### Bachelor of Science in Sustainability

**Required Core Courses:** 18 units

All University College undergraduate students must satisfy the same general-education requirements ([http://bulletin.wustl.edu/undergrad/ucollege/bachelors/#degereerequirements](http://bulletin.wustl.edu/undergrad/ucollege/bachelors/#degereerequirements)).

Requirements specific to the BS in Sustainability include the following:

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>SUST 205</td>
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<td>3</td>
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<tr>
<td>SUST 328</td>
<td>Environmental Law: Applications Toward Sustainability</td>
<td>3</td>
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<tr>
<td>SUST 368</td>
<td>Sustainability as Transformative Agent in Business and Public Policy</td>
<td>3</td>
</tr>
<tr>
<td>SUST 450</td>
<td>Sustainability Capstone</td>
<td>3</td>
</tr>
<tr>
<td>Bio 413</td>
<td>Environmental Science: Regional and Global Perspectives</td>
<td>3</td>
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<tr>
<td>Bus 364</td>
<td>Strategic Planning</td>
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**Total Units** 18

#### Sustainable Environment and Science Concentration

**Required Courses:** 18 units

A concentration in sustainable environment and science is a good foundation for careers in environmental fields, such as environmental manager, landscape manager or waste manager. It is also useful for those wanting to pursue an advanced degree in a related field of interest.

Students will select among electives based on approved available course offerings in consultation with their adviser. Examples of elective options include the following:

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<tbody>
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</tr>
<tr>
<td>Anthro 3795</td>
<td>Anthropology and Climate Change: Past, Present, and Future</td>
<td>3</td>
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<tr>
<td>Bio 419</td>
<td>Ecology</td>
<td>4</td>
</tr>
<tr>
<td>Bio 4631</td>
<td>Urban Agriculture and Sustainable Food Systems</td>
<td>3</td>
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<tr>
<td>GIS 200</td>
<td>Introduction to GIS</td>
<td>3</td>
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<tr>
<td>GIS 303</td>
<td>Digital Cartography</td>
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<tr>
<td>PolSci 3312</td>
<td>Environmental and Energy Issues</td>
<td>3</td>
</tr>
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#### Sustainable Management and Organizations Concentration

**Required Courses:** 18 units

A concentration in sustainable management and organizations is a good foundation for careers in the business or institutional applications of sustainability, such as sustainable project manager, facilities manager or materials manager. It is also useful for those wanting to pursue an advanced degree in a related field of interest.

More examples of elective options include the following:

<table>
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<tr>
<td>Bus 224</td>
<td>Introduction to Project Management</td>
<td>3</td>
</tr>
<tr>
<td>Bus 290</td>
<td>Design Thinking: Human-Centered Approaches to Making the World</td>
<td>3</td>
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<tr>
<td>Bus 303</td>
<td>Introduction to Supply Chain Management</td>
<td>3</td>
</tr>
<tr>
<td>Bus 339</td>
<td>Principles of Management</td>
<td>3</td>
</tr>
<tr>
<td>Econ 355</td>
<td>Environmental Economics</td>
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### Urban Sustainability Concentration

**Required Courses:** 18 units

A concentration in urban sustainability is a good foundation for careers in urban-scale public policy and programs, such as community manager, planning consultant or nonprofit manager. It is also useful for those wanting to pursue an advanced degree in a related field of interest.

Students will select among electives based on approved available course offerings in consultation with their adviser. Examples of elective options include the following:

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<tr>
<td>SUST 317</td>
<td>Urban Ecology: Principles and Practice</td>
<td>3</td>
</tr>
<tr>
<td>SUST 319</td>
<td>Planning Sustainable &amp; Racially Equitable Urban Communities</td>
<td>3</td>
</tr>
<tr>
<td>SUST 325</td>
<td>Introduction to Resilience</td>
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### Degree in Sustainability (No Concentration)

**Required Courses:** 18 units

Students will select among sustainability electives, including all courses offered in the concentrations.

### Additional Information

Undergraduate and graduate degree and certificate programs offered through University College are not offered by the Olin Business School at Washington University and do not come under the accreditation responsibility of the Association to Advance Collegiate Schools of Business (AACSB). No more than 25 percent of course work applied to a Bachelor of Science in University College may be in business disciplines.

### Courses


#### U19 SUST 107 Environmental Geology and Energy

Environmental impact of current energy sources and potential for alternative energy sources. Energy production effects on global climate change. Interplay of natural and human-induced climate change. Fossil fuel sources and uses. Nuclear power generation and problems with nuclear waste disposal. Examination of proposed disposal sites. Alternative energy sources, including solar, wind, geothermal, and hydrogen, compared to fossil fuel and nuclear power use. Intended for non-science majors. Prerequisites: none. Same as U13 EPSc 107. Credit 3 units.

#### U19 SUST 200 Introduction to GIS

This course introduces students to the fundamental principles and applications of geographic information systems (GIS), their underlying geospatial science and spatial thinking. This problem-based course explores applications of GIS to spatial questions in the areas of social science, business, the humanities and earth sciences. Example topics include understanding spatial data types; map coordinate systems and projections; basic spatial data analysis; acquiring, editing, creating and managing geospatial data; and processing and visualizing data using GIS. This hands-on course works through problems using (mainly) ESRI ArcGIS software (including ArcMap and ArcCatalog), but other open source tools will also be introduced. Students who complete this course should be able to apply skills to think through a spatial problem and employ GIS tools to address it. Same as U90 GIS 200. Credit 3 units.

#### U19 SUST 205 Foundations and Practice of Sustainability

This interdisciplinary course serves as an introduction to sustainability concepts, sustainability practice, and systems thinking. Students in this course will develop and articulate a sustainability concept, sustainability practice, and systems thinking. Students in this course will develop and articulate a common understanding of foundational sustainability concepts, including definitions, global challenges, human impacts, and approaches to sustainability solutions. Students will also start to understand and develop the competencies (knowledge, skills, attitudes) needed for success as a sustainability advocate or practitioner in professional settings, including systems thinking, strategic planning, group collaboration, and communicating the case for sustainability to various and specific audiences. Credit 3 units.

#### U19 SUST 209 Introduction to Environmental Studies

This course examines the physical, chemical, and biological components of the environment. We will focus on the ecological principles that are the basis of environmental science. We will then explore how environmental studies incorporate concepts from politics, social sciences, economics, ethics, and philosophy. A central theme of the course is the effect of human societies on the environment, and how individual human and societal behavior can be modified to minimize the deleterious effects on the environment. This course is fully online. Students enrolled in day classes at Washington University should review the policies of their home division on credit earned for online courses.
U19 SUST 2352 Introduction to Environmental Ethics
A general survey of current issues in environmental ethics, focusing on problems such as the obligation to future generations, protection of endangered species, animal rights, problems of energy and pollution, wilderness, global justice, and business obligations. Students will also learn some ethical and political theory.
Same as L30 Phil 235F
Credit 3 units. A&S IQ: HUM Arch; HUM Art; HUM BU; ETH EN: H

U19 SUST 303 Digital Cartography
In today’s world, it is imperative that students develop the necessary skills to communicate their ideas to a large audience in an efficient manner. Graphics and visual representations are one of the most effective ways to neatly convey complex data sets to readers. This course presents both theoretical and hands-on mapping and graphical problems to students. Students will learn to solve these problems with self-created solutions. The course teaches students the basics of GIS-based mapping for producing publishable work. Students will develop basic skills in computer-aided mapping and computer drafting, primarily using ArcGIS, Adobe Illustrator, Adobe Photoshop, and Microsoft PowerPoint. Students will also be introduced to other mapping or statistical programs as needed.
Same as U90 GIS 303
Credit 3 units.

U19 SUST 3030 Introduction to Human Ecology
Human ecology investigates the complex relationships between humans and their environment. The discipline is typically divided into two primary fields of research: cultural ecology (the study of cultural solutions to environmental challenges) and human biological ecology (the study of physical changes that occur in response to environmental stressors). This course examines both biological and cultural human adaptation to Earth’s major ecosystems and surveys human subsistence strategies within these environments. Students will investigate the consequences of population growth, modernization, nutritional disparities, medical ethics, and environmental stewardship in a globalized world. The final section of the course will focus on world globalization, modernization, inequality, and health.
Same as U69 Anthro 3030
Credit 3 units. UColl: OL

U19 SUST 317 Urban Ecology: Principles and Practice
More than half of the world’s population now lives in an urban environment. Studies have shown that connecting to nature can benefit people, and savvy municipalities are attuned to the positive role that ecology can play in the urban core. How can people and nature co-exist in ways that are mutually beneficial? In this intensive course, students will examine multiple techniques and applications of urban ecology. Class time will be used to review and discuss urban ecology principles from the readings and visuals. Local excursions — such as to Forest Park, Citygarden and Cortex — will present opportunities to personally experience urban ecology practices. Students will be expected to make their own field trip arrangements, but assistance will be provided with public transportation options. As their final course project, students will develop an urban ecology project proposal and design. The course is designed as an urban ecology overview and foundation — (1) What urban ecology is: underpinning and forerunners in the field, (2) Why urban ecology is important: potential benefits (social, economic, environmental), (3) How urban ecology is being applied: implementation techniques and approaches.
Credit 3 units.

U19 SUST 319 Planning Sustainable & Racially Equitable Urban Communities
This course explores principles, ethics and practice for planning sustainable and equitable urban communities. Learning how to manage resources for both current and future generations, students will gain greater understanding of the importance of integrating environmental, economic, social and institutional efficiency. With a focus on communities in the St. Louis region, students in this course will focus on equity and community capitalism aimed at ensuring that fairness and well-being are inclusive for all people in providing for health, safety and the built environment. You will learn to integrate and utilize a racial equity lens, trauma-informed approaches, cultural competence and Anti-Bias/Anti-Racism practices to help lead to better decision-making and creating solutions aimed at reducing adverse impacts on the environment, preventing gentrification, improving the welfare of people, and shaping urban areas and neighborhoods into healthier, robust and more equitable communities. This course will prepare the student to be a leader-advocate for sustainable urban planning and community development, whether as an elected or public official, a professional staff person, or a citizen volunteer.
Credit 3 units. UColl: OL

U19 SUST 325 Introduction to Resilience
Resilience signifies the capacity to adapt to changing conditions and to maintain or regain functionality and vitality in the face of disturbances whether natural (such as tornadoes, hurricanes, earthquakes) or man-made (such as civil unrest, economic downturn, aging infrastructure). This course will explore multiple aspects of resilience from social, environmental and infrastructure perspectives. Social resilience reinforces the role of communities in building resilience, environmental resilience examines the role of natural systems to serve as mentors for resilience, and infrastructure resilience looks at the role of built structures and systems in fostering resilience. We will examine common attributes that build resilience across different perspectives (social, environmental, infrastructure) and settings (e.g., city, neighborhood, building). Resiliency is a core competence. This course will expose students to a wide range of disciplines and experiences — environmental studies, history, urban planning, business, political
science, design, to name a few — and students will be guided to apply course skills and strategies to their own interests and goals. Credit 3 units.

U19 SUST 328 Environmental Law: Applications Toward Sustainability
This course provides an overview of significant environmental legal and policy issues. It will be taught from a sustainability practitioner’s perspective, linking environmental law to sustainability applications. The content touches on both environmental hazards and natural resource issues, and they will be discussed within the scope of both a legal and sustainability framework. The goal of the course is to provide the students with a general understanding of numerous environmental issues — such as they might encounter in the field of sustainability — and to help them develop the knowledge and tools that will be useful in addressing those environmental issues. Credit 3 units. UColl: OLI

U19 SUST 3312 Environmental and Energy Issues
This course considers the major issues in these increasingly important areas of public policy. We discuss the importance of political processes and actors on such phenomena as global warming, endangered species, and public lands. This course emphasizes the American experience but also considers international implications. Same as U25 PolSci 3312 Credit 3 units. UColl: OLI, PSA

U19 SUST 332 Conservation Biology and Biodiversity
This overview of the fields of conservation biology and biodiversity covers topics such as species preservation, habitat restoration, refuge design and management, and human population growth. Does not count for day, undergraduate biology majors. This is a fully online course. Only University College students receive credit for fully online courses. Same as U29 Bio 432 Credit 3 units. UColl: OLI

U19 SUST 3322 Sustainability Policy
Same as U25 PolSci 3322 Credit 3 units.

U19 SUST 337 Sustainable Food Systems Thinking
Planning a more sustainable future and an equitable and healthy present requires us to critically examine the current food system and to understand the key challenges it faces in a world of rapid urbanization, population growth, and climate change. What does the future of food look like? How are food visionaries working to create those futures now? In this course, students will learn to articulate the multiple facets of the food system and how they intersect with frameworks of sustainability, history, health and nutrition, policy, technology, culture, food activism, and biodiversity. We examine our own personal food behaviors to illuminate challenges at the individual level so that we can begin to scale up solutions. We will study the approach of change makers in this field and look at ways to integrate food systems thinking into multiple aspects of both personal life and professional practice. This course fulfills the Social Science General Education requirement for University College undergraduate students. Credit 3 units. UColl: SSC

U19 SUST 344 Global Development and Sustainability
This course examines those activities, public and private, designed to bring a greater quality of life to an area, region or country and the people living there. While broad in scope, the discipline of Development can be focused in four ways. The first and broadest is economic development and in particular foreign aid, economic interventions, and the rise of the multinationals. The second focus looks at the cultural dimensions of development and in particular globalization, indigenous cultures, and the development of the new localism. The third explores the political dimensions of development with a particular attention to the systems and models of local, national and regional politics. The fourth analyzes the technological dimension of development with special emphasis on agricultural and communications technologies. By looking at how the field of global development has shifted toward sustainability, we will study principles and practices of sustainable development, particularly in the context of global challenges, exploring these economic, cultural, political, and technological dimensions. We will apply models and methods to contemporary cases in first, third, and second world cultures that involve business, government, nonprofit organizations, and NGOs. Credit 3 units.

U19 SUST 3463 Global Health Issues
This course is designed to inform and challenge participants to observe and solve problems relating to world health issues while teaching basic biology concepts. Participants will investigate barriers to solving problems of Nutrition, Infectious disease and Environmental factors that prevent progress of global communities. They will also research new technologies being developed that could potentially provide solutions as well as create an ideal lesson using global health issues the focus. Open to Post-Bacc Students. Prerequisite: General Biology I or permission from the instructor. This course is fully online. Students enrolled in day classes at Washington University should review the policies of their home division on credit earned for online courses. Same as U29 Bio 463 Credit 3 units. UColl: OLI

U19 SUST 355 Environmental Economics
Environmental economics is a subfield of economics concerned with environmental issues, both theoretical as well as applied and public-policy oriented. Central to environmental economics is the concept of market failure, particularly the existence of externalities. Correcting for externalities and crafting acceptable public policy responses will be a central focus of this course. Topics explored will include: consumer theory and valuation; pollution and production theory; environmental protection and welfare; the Coase Theorem; resource management; and economic growth and environmental sustainability. Prerequisite: Econ 1011. Same as U07 Econ 355 Credit 3 units.

U19 SUST 364 Global Sustainability
Global Sustainability explores our relationship with planet earth. Taking an ecological systems perspective, this course provides students with the knowledge and understanding of the scientific, cultural, social, political, economic, and technological conditions that affect the quality of life on our planet. Due to the cross-disciplinary nature of these conditions and issues,
the course will touch on many different subject areas, including ecology, conservation biology, economics, and political science. The overarching theme of environmental sustainability will be interwoven throughout the course. Topics covered include an overview of the global commons, ecosystem integrity and health, the human footprint, biodiversity and human health, the pollution and degradation of the global commons, ecological economics, the international system and environmental politics, resource management, and sustainable development.

Same as U29 Bio 364
Credit 3 units. UColl: OLI

U19 SUST 3641 Strategic Planning
If you are a new business owner, experienced manager, executive, entrepreneur or nonprofit director wanting to utilize the newest, easy to use and implement, most practical approaches to strategic planning within your organization, these are the tools to begin your journey. Leading the strategic planning tools and templates can help you successfully focus your new or existing business or nonprofit on tackling the tough issues of today and the future. The course will emphasize how to create, implement and manage successful change within your organization. Using case studies, industry leaders, text and discussion, we will examine and use fundamental principles and tools that relate to successful strategic planning and decision making. Students will develop written and oral presentation skills in the context of strategic planning; understand how to motivate the organization and, as a capstone project, design and receive feedback on a draft strategic plan for their business, function or board.

Same as U44 Bus 364
Credit 3 units.

U19 SUST 368 Sustainability as Transformative Agent in Business and Public Policy
This course examines how sustainability drives and is driven by public policy and business. Participants will acquire skills and techniques to apply sustainability in the marketplace, concentrating on public and business organizations. We will explore how profit drives sustainability as a business practice and whether it assists or interferes with public policy objectives around environment, public health, jobs, social mobility, and economic development. As a culminating project, students will develop a sustainability proposal either for government or the private sector.

Credit 3 units.

U19 SUST 3795 Anthropology and Climate Change: Past, Present and Future
This course provides an overview for interplay between humanity and global climate change that encompasses three-field anthropological subjects. Course material includes the role of climate change in shaping human evolution, human solutions to climatic challenges through time, the impact of human activities on the climate, and modern sociocultural examinations of how climate change is affecting the lives of people around the world.

Same as U69 Anthro 3795
Credit 3 units. UColl: OLI

U19 SUST 381 Evolutionary Medicine
Evolutionary Medicine examines how human evolution relates to a broad range of contemporary health problems including infectious, chronic, nutritional, and mental diseases and disorders. The primary goal of the course is to compare modern human environments and behaviors with the conditions under which humans evolved to determine the extent to which medical conditions of the present may be a consequence of adaptation to different conditions of the past. Hybrid online.

Same as U29 Bio 481
Credit 3 units.

U19 SUST 398 Honors Research in Sustainability
Part I of the Honors Thesis. Requires admission to the Honors Program in University College and a signed proposal.

Credit 3 units.

U19 SUST 413 Environmental Science: Regional and Global Perspectives
This course examines the interrelationships between humans and their environment, moving from local and regional views up to a global perspective. Taking an ecosystem approach, the course starts with the basic ecological principles necessary for understanding our environment. We will then explore how environmental science incorporates concepts from politics, social sciences, economics, ethics, and philosophy; physical and biological resources; conservation, management, sustainability, and restoration; population principles; environmental economics; human impacts (especially pollution and disturbance); environmental health and toxicology; and environmental policy. Lectures and discussions will focus on the major issues involved in environmental challenges, drawing on current, carefully selected articles from some of the most respected magazines, newspapers, and journals published today. Prerequisite: General Biology I or permission of the instructor.

Same as U29 Bio 413
Credit 3 units. UColl: OLI

U19 SUST 4140 Sustainable Development and Conservation: Madagascar
This course focuses on sustainable development in rural subsistence economies, using Madagascar as case study. Students from diverse disciplines are challenged to develop and assess the feasibility of projects that can have a positive impact on communities constrained by poverty traps. The span of projects includes topics such as forest conservation and use, nutrition, health, food security, clean water, education, and bottom-up economic growth. Students in humanities, social sciences, business, design, engineering, physical sciences, law, social work, economics, political science, public health and others use their different perspectives to search for answers. Teamwork and peer teaching are central to the course. Competitively evaluated projects will be field-tested in Madagascar. Selected teams will travel to Madagascar in May and work with the Missouri Botanical Garden Community Conservation Program to adapt projects to conflicting environmental, cultural, economic, and political factors. Poster board sessions for students taking the trip occur in the fall term. Project teams selected to go to Madagascar will be assessed a lab fee at the time their participation in the trip is confirmed. The lab fee covers the cost of airfare, in-country transportation, and approximately three weeks of in-country lodging and food. Undergraduate students should register for the course using one of the undergraduate cross-listed course numbers.

Same as U85 IA 5142
Credit 3 units.
**U19 SUST 419 Ecology**

Community ecology is an interdisciplinary field that bridges concepts in biodiversity science, biogeography, evolution and conservation. This course provides an introduction to the study of pattern and process in ecological communities with an emphasis on theoretical, statistical and experimental approaches. Topics include: ecological and evolutionary processes that create and maintain patterns of biodiversity; biodiversity and ecosystem function; island biogeography, metacommunity dynamics, niche and neutral theory; species interactions (competition, predation, food webs), species coexistence and environmental change. The class format includes lectures, discussions, and computer labs focused on analysis, modeling and presentation of ecological data using the statistical program R. Prereq: Bio 2970 required, Bio 381 recommended, or permission of instructor. Same as U29 Bio 419 Credit 4 units.

**U19 SUST 450 Sustainability Capstone**

This is the required capstone/practicum course for the Bachelor of Science in Sustainability, Certificate in Sustainable Environment and Science, Certificate in Sustainable Management and Organizations, and Certificate in Sustainable Communities and Development. This is a 3-unit experiential course, faculty supervised and tailored to each student's professional goals, that applies concepts and skills from earlier courses to a hands-on sustainability project in a work or studio setting. Credit 3 units.