The following degree programs have sustainability learning outcomes:

**School of Arts & Sciences (SAS)**

* B.A. in Environmental Studies
	+ The Environmental Studies major provides graduates with the necessary skills to contribute to society and effectively work on challenging problems that face humanity. Students acquire knowledge in environmental economics, environmental health, sustainability, renewable resources, and environmental management. In addition, they have an in-depth understanding of the human-environment interconnection, knowledge of international and domestic environmental issues, and are well-versed in environmental policies and how these policies are set and changed.
	<https://catalog.upenn.edu/undergraduate/programs/environmental-studies-sustainability-management-ba/>
* B.S. in Earth Science
	+ The mission of the Earth Science department is to bring the time perspective of the Earth scientist to bear on contemporary problems of natural-resource conservation and environmental quality.
	<https://www.sas.upenn.edu/earth/>
* Master of Science in Organizational Dynamics, Concentration in Sustainable Development
	+ The Sustainable Development (SD) studies concentration concerns the ability of an organization to meet their present needs and interests without compromising the ability of future generations to do the same. How an organization builds and supports a culture that systemically integrates meeting the triple‐bottom‐line (people/social, product/economic and planet/environment) is central to this concentration. This concentration addresses the challenge of creating a sustainable culture by changing the patterns of behavior and practice of an organization's members and stakeholders.
	<https://www.lps.upenn.edu/degree-programs/dynamics/curriculum/concentrations-certificates>
* Master of Applied Geosciences
	+ The Penn Master of Science in Applied Geosciences provides students with theoretical and technical expertise in geochemistry, geophysics, hydrogeology, and engineering geology. It also concentrates on project management skills necessary for leadership in environmental remediation and pollution prevention. Students learn approaches to mitigating soil and water contamination, solving waste disposal challenges and responding to human-induced natural disasters such as landslides and floods.
	<https://www.lps.upenn.edu/degree-programs/msag>
* Master of Environmental Studies
	+ With many different concentrations within the program, the following is an example of the Environmental Policy learning outcome: In the Environmental Policy concentration, students will integrate knowledge gained from many disciplines and learn practices that balance environmental results, public interests and the economy. Government officials, business leaders, advocacy groups and academics all benefit from the ability to develop and implement workable environmental policies. This concentration provides students with the knowledge needed to understand what factors are considered in the development of environmental policies, and offers real-life insights into the challenges of implementing these policies.
	<http://www.sas.upenn.edu/lps/graduate/mes>
* PhD in Earth Science
	+ The mission of the Graduate Group of the Department Earth and Environmental Science is to produce independent, well-rounded scientists that are exceptionally competent in their area of specialization and capable of understanding, solving, and communicating complex and interdisciplinary scientific issues. The graduate group guides research leading to Doctoral degrees in Earth Science in the range of fields that encompass our research interests: Biogeochemistry (terrestrial and ocean), Environmental Geology, Geophysics, Paleobiology, and Surficial processes.
	<https://catalog.upenn.edu/graduate/programs/earth-environmental-science-phd/>
* B.A. in Science, Technology, & Society
	+ Science, Technology & Society (STSC) examines the social contexts and consequences of science and technology. In a wide array of courses, STSC students learn to think critically about questions such as: Why does modern science look the way it does? How and why do particular technologies and technological systems emerge, expand and become obsolete? How do science and technology sometimes exacerbate race, gender and class inequalities, and how might they be changed to reduce them? How do science and technology shape society, and how does society shape science and technology? STSC’s submajors focus on more specialized interests within science and technology studies, including biotechnology and biomedicine, energy and environment, global science and technology, information and organizations, and the history and philosophy of science.
	<https://hss.sas.upenn.edu/undergraduate/science-technology-society-major>
* B.A. in Urban Studies
	+ Urban Studies students learn about urban history and current challenges. They come to understand how policy at the national level and global economic trends affect what we see at the local, even neighborhood level. In a broad, theoretical sense, the central intellectual frame of Urban Studies is about understanding people and place at different spatial scales. Individuals, groups, and public officials make decisions and design policy that in turn affects how people and resources are distributed in space and defines what kinds of places result. Urban Studies students take this understanding to explain the conditions of urban places and work towards creating places that foster equity, better health outcomes, environmental sustainability, and a better quality of life.
	<https://catalog.upenn.edu/undergraduate/programs/urban-studies-ba/>
* Minor in Environmental Science
	+ the Environmental Science minor provides graduates with the necessary skills to contribute to society and effectively work on challenging problems that face humanity. Students acquire knowledge in environmental economics, environmental health, sustainability, renewable resources, and environmental management.
	<https://www.sas.upenn.edu/earth/minors/environmental-science-minor>
* Minor in Environmental Studies
	+ The Environmental Studies minor provides graduates with the necessary skills to contribute to society and effectively work on challenging problems that face humanity. Students acquire knowledge in environmental economics, environmental health, sustainability, renewable resources, and environmental management.
	<https://www.sas.upenn.edu/earth/minors/environmental-studies-minor>
* Minor in Landscape Architecture
	+ The Minor in Landscape Studies provides students with an opportunity to learn about the design, shaping, and transformation of landscapes throughout human history. Students in the Minor learn and explore how political, social, artistic, and environmental values are represented in and through landscape as an expression of human culture and the cultural imagination. Furthermore, students learn how landscapes can both reflect and change our ideas about relationships between the natural world and society.
	<https://www.design.upenn.edu/landscape-architecture/undergraduate-minor>
* Minor in Urban Studies
	+ The Urban Studies minor offers students an opportunity to think and learn about cities in an informed, disciplined and integrated way. The program introduces a variety of perspectives on the origins, development, and nature of cities, stressing the application of theory to practice. Students take four Urban Studies courses, and complete an internship for an additional two CUs in this six CU minor. The internship component allows students the opportunity to work closely with a community group, public agency, non-profit or private organization in the city.
	<https://catalog.upenn.edu/undergraduate/programs/urban-studies-minor/>

**Weitzman School of Design**

* B.A. in Architecture
	+ The Major in Architecture is for students who intend to pursue a career in architecture or a related design discipline (e.g., landscape architecture, urban design, product design, etc.). The Major is a studio-based liberal arts program offering three concentrations: design, history & theory, and intensive design. All three discuss design of the built environment.
	<https://catalog.upenn.edu/undergraduate/programs/architecture-design-ba/>
* Master of Architecture
	+ The Master of Architecture is a comprehensive and rigorous program, preparing graduates for the full range of activities in the profession. An intensive sequence in Design Studios constitutes the focus of the program. Thorough training is also provided in history, theory, technology, ecology, society, and professional practice. Studios and courses are supported by a rigorous program in visual studies that develops skills in digital and new media. At the upper levels of the program students establish individual trajectories by selecting from a range of elective studios and courses with leading figures in design, technology and theory. The final year culminates in advanced design studios that include research directed by leading designers as well as the option of an independent thesis. Summer programs abroad and studios based in other countries provide opportunities for international studies. The program aims to develop critical, creative and independent thinking that realizes potentials within an ever-changing world.
	<https://www.design.upenn.edu/architecture/graduate/professional-program-march>
* PhD in Architecture
	+ The Ph.D. Program in Architecture is focused on the production of knowledge in the historical, theoretical, or technological development of architecture, landscape architecture, and historic preservation. Operating within the context of a design school in a university setting, it is a fundamentally interdisciplinary program, and seeks to explore opportunities in the wider university to reconsider the terms, methods, and futures of architectural knowledge. The Program is especially interested in interdisciplinary scholarship that explores and rescripts the boundaries of the discipline. Projects in History/Theory often explore connections between architectural histories and theories and histories of technology and environment; of race, class, and gender; of politics, economics, and equity; many are attuned to the role of media in producing and understanding architectural ideas. Technological research operates on structural and environmental knowledge.
	<https://www.design.upenn.edu/architecture/phd/about>
* Master of City & Regional Planning
	+ The Master of City & Regional Planning includes six concentrations (Community and Economic Development, Land Use and Environmental Planning, Public-Private Development, Smart Cities, Sustainable Transportation and Infrastructure Planning, or Urban Design). Critical problem solving is key and includes the following topics: continuing migration to cities; working to upgrade slum housing, and finding practical solutions to problems of climate change and environmental degradation. Planners also address renewing and redesigning the nation's characterless suburbs; protecting vulnerable communities from the effects of the financial meltdown; and turning sustainability and resiliency from buzzwords into best practices.
	<https://www.design.upenn.edu/city-regional-planning/graduate/graduate-city-and-regional-planning-about-0>
* PhD in City & Regional Planning
	+ The PhD in City & Regional Planning guides students through developing strong research and communication skills. The program looks at urban problems including: housing, sustainability, migration, and protection of vulnerable communities.
	<https://www.design.upenn.edu/city-regional-planning/phd/about>
* Master of Landscape Architecture
	+ Department advances this legacy through its commitment to innovative design as informed by ecology, the history of ideas, techniques of construction, new media, and contemporary urbanism. Students are introduced both to the varied scales of landscape architecture and encouraged to critically challenge and extend the field’s scope. These concerns are most developed in the design studios, where students are encouraged to explore and expand their own creativity while learning the necessary conceptual, visual and technical skills to properly develop their work. Courses in history and theory, technology (ecology, horticulture, earthwork, construction, and project management), and visual and digital media are synchronized with the studios.
	<https://www.design.upenn.edu/landscape-architecture/landscape-architecture-about>
* Master of Science in Historic Preservation
	+ Historic preservation addresses change responsive to the historic environment. At a time when society increasingly realizes the historical and cultural value of that inherited environment and what has been lost through the destruction of buildings, landscapes, and communities, the field of historic preservation has become central to the design, adaptive use, planning, and management of buildings, cities, and regions. By understanding the time dimension in human culture, it identifies history as an integrated component of the continuous change responsible for the material, psychological, and symbolic qualities of our environment. The Graduate Program in Historic Preservation provides an integrated approach for architects, landscape architects, planners, historians, archaeologists, conservators, managers, and other professionals to understand, sustain, and transform the existing environment.
	<https://www.design.upenn.edu/historic-preservation/historic-preservation-about>
* Master of Science in Environmental Building Design
	+ The MSD in Environmental Building Design is a specialized, post-professional degree developed to train architects in the new skills and knowledge required for environmental design and especially in the design techniques with which those skills must be integrated into the practice of architecture. The one-year course of study includes coursework on building performance simulation, integrated building design, building envelopes and systems, lighting, daylighting, and the theory and practice of environmental design. Coursework is complemented and extended by a Performance Design Workshop and then explored in depth in an intensive Environmental Design Studio in the early summer.
	<https://www.design.upenn.edu/architecture/graduate/master-environmental-building-design-mebd>
* Graduate Certificate in Ecological Architecture
	+ The basic goal of the certificate in ecological architecture is to help students develop an understanding of the dynamic interaction between the natural and built environments, and to introduce performance based techniques for operating in that interaction. Ecological design can involve many different kinds and scales of practice, from landscapes to products, and draws on many fields of expertise. In its broadest form it is open, contingent, historical (non-reversible), and organic to its environments.
	<https://www.design.upenn.edu/interdisciplinary-programs/ecological-architecture-certificate>
* Graduate Certificate in Ecological Planning
	+ The Certificate in Ecological Planning draws on courses within the School of Design, the Environmental Studies Program, and other schools to offer students an interdisciplinary approach to Ecological Planning. The availability of water and managing stormwater and wastewater have become critical issues in planning for the future of human settlements. Of paramount importance is for students to understand the role of natural cycles (hydrologic, carbon, nitrogen, etc.) and the varying carrying capacity of different landscapes to support human settlements.
	<https://www.design.upenn.edu/all-degrees-certificates/certificate-ecological-planning>
* Graduate Certificate in Environmental Building Design
	+ The certificate in Environmental Building Design is open to students enrolled in the Master of Architecture program. The courses focus on integration of ecology, technology, and design along with building performance through studio courses and seminars.
	<https://www.design.upenn.edu/all-degrees-certificates/certificate-environmental-building-design>
* Graduate Certificate in Land Preservation
	+ This certificate is aimed at two types of students: working practitioners needing basic training in land preservation or updating about current practices and graduate students in Penn’s schools interested in adding knowledge about land preservation practices to their professional qualifications. The latter include students in the School of Design, Arts and Sciences (especially Environmental Studies), Fels, Law, and Wharton.
	<https://www.design.upenn.edu/all-degrees-certificates/land-preservation-certificate>
* Graduate Certificate in Real Estate & Development
	+ This certificate’s courses look at property development and real estate topics that include environmental assessment and sustainability certification (LEED).
	<https://www.design.upenn.edu/all-degrees-certificates/real-estate-design-and-development-certificate>
* Graduate Certificate in Urban Design
	+ The curriculum for the Certificate in Urban Design includes courses in the fundamental principles of urban design, how urban design is produced and implemented, the history and theory of urban design and an interdisciplinary studio emphasizing design as research. The Studio investigates important current urban issues either in the U.S. or in an international setting and approaches urbanism through a range of contemporary theoretical and methodological lenses including environmental topics.
	<https://www.design.upenn.edu/all-degrees-certificates/urban-design-certificate>
* Graduate Certificate in Urban Redevelopment
	+ The Urban Redevelopment Certificate is for Weitzman School graduate students who want to expand their knowledge of, and expertise in the physical, economic, and neighborhood redevelopment of central cities and older suburban communities. Topics include environmental impacts on development and preservation of land.
	<https://www.design.upenn.edu/all-degrees-certificates/urban-redevelopment-certificate>
* Graduate Certificate in Urban Resilience
	+ This certificate draws on the resilience (including environmental resilience) expertise within the different departments of the School, and builds upon a rich legacy at Penn rooted in Ian McHarg’s layered analysis methods of thinking holistically across systems and scales to offer a foundational program for "resilience by design." Additionally, the certificate includes a flexible set of courses offered at Weitzman School, as well as at Wharton and the School of Engineering and Applied Science. The certificate is intended for professional graduate students enrolled at Weitzman School interested in adding an understanding of urban resilience, and how to design within a risky and uncertain world, to their list of educational qualifications.
	<https://www.design.upenn.edu/all-degrees-certificates/urban-resilience>

**School of Engineering & Applied Science (SEAS)**

* B.S. in Chemical & Biomolecular Engineering
	+ The Chemical and Biomolecular Engineering major explores topics ranging from soft materials to molecular and cellular biophysics to materials simulation to advanced methods of energy conversion, as well as more traditional areas of chemical engineering, including transport phenomena and process design. Emphasis on the basics of chemistry, biomolecular and engineering science is the key to the great flexibility and power offered by a degree in chemical and biomolecular engineering in a rapidly changing technological environment. Penn’s chemical engineering curriculum is designed to ensure that every student receives thorough training in fundamental concepts of permanent relevance and the physical, biotechnological, and chemical principles underlying the engineering profession.
	<https://cbe.seas.upenn.edu/undergraduate/>
* B.S. in Mechanical Engineering & Applied Mechanics
	+ The Mechanical Engineering and Applied Mechanics undergraduate curriculum gives our students hands-on, real world lab work in addition to a strong background in theoretical knowledge. The addition of interactive, design-centered assignments is creating educational experiences that are preparing Penn’s mechanical engineers for the problems they will solve in industry and research, including problems of sustainability. <https://www.me.upenn.edu/undergraduate/>
* B.S. in Materials Science & Engineering
	+ The Materials Science and Engineering (MSE) program reflects the explosive growth of interest in the nano and bio sectors of engineering science and technology. MSE prepares students to use fundamental scientific principles to synthesize, manipulate, design and characterize the structural and functional properties of advanced engineering materials including looking at the environmental impact of the materials.
	<https://mse.seas.upenn.edu/undergraduate/>
* Master of Science in Chemical & Biomolecular Engineering
	+ The Chemical and Biomolecular Engineering master's is for students who wish to prepare themselves for research and development activities by obtaining a more solid foundation in the principles of chemical and biomolecular engineering. At the same time, limited specialization in one of several ﬁelds, such as fluid mechanics, thermodynamics, control, design, bioengineering, polymer engineering, heat transfer, or computer applications is possible.
	<https://cbe.seas.upenn.edu/masters/>
* Master of Science in Mechanical Engineering & Applied Mechanics
	+ The graduate program in Mechanical Engineering and Applied Mechanics is an in-depth, hands-on approach to graduate study, centering on the research areas of biophysics, mechanics of materials, fluid mechanics, design, manufacturing, robotics, thermal sciences, and energy conversion.
	<https://www.me.upenn.edu/masters/>
* Master of Science in Materials Science & Engineering
	+ The graduate program in Master of Science in Materials Science & Engineering looks deeper at engineering science and technology, including a close look at energy and emissions efficiency in the materials for energy focus. The school works with the Laboratory for Research on the Structure of Matter (LRSM), to open up new fields in materials science, prepare tomorrow’s leaders, and put Penn's knowledge to practical use in today’s high-tech society. The multidisciplinary program allows students to tailor their education to their own professional and career goals, from ceramics, polymers, and metals to non-structured and soft materials.
	<https://mse.seas.upenn.edu/masters/>
* PhD in Chemical & Biomolecular Engineering
	+ The PhD in Chemical & Biomolecular Engineering program research topics such as soft matter and complex fluids, advanced materials and nanotechnology, cellular and biomolecular engineering, catalysts and reaction engineering, systems engineering, energy and environmental engineering, and molecular simulation and thermodynamics.
	<https://cbe.seas.upenn.edu/doctoral/>
* PhD in Mechanical Engineering & Applied Mechanics
	+ Penn’s PhD in Mechanical Engineering & Applied Mechanics allows students to focus on research in the following areas: biomechanics, computational mechanics, fluid mechanics, mechanical systems, mechanics of materials, micro- and nanomechanics, and thermal sciences and energy conversion. Thermal science and energy conversion research looks at areas such as renewable energy/alternate energy generation and methods for material processing.
	<https://mse.seas.upenn.edu/doctoral/>
* PhD in Materials Science & Engineering
	+ Provided through the School of Arts & Sciences, students in the PhD in Materials Science & Engineering program research topics diverse, interdisciplinary topics including the impact of materials on energy generation and the energy efficiency of structural materials.
	<https://mse.seas.upenn.edu/doctoral/>
* Minor in Energy & Sustainability
	+ The minor in Energy and Sustainability provides students with broad coverage of technical and societal issues in energy and sustainability. It is designed to help students become leaders in developing technologies for a more sustainable energy future.
	<https://catalog.upenn.edu/undergraduate/programs/energy-sustainability-minor/>

**School of Nursing**

* Minor in Global Health
	+ The Global Health minor is an opportunity to increase students’ knowledge of the world and the factors that contribute to the health of populations. The ever-growing threat of pandemics, terrorism, natural disasters, and climate-related challenges has sharpened the need for skilled nurses who understand the global interconnectedness of health.
	<https://www.nursing.upenn.edu/global-health-minor/>

**Perelman School of Medicine**

* Master of Public Health
	+ The Penn MPH Program prepares students to be public health leaders by integrating research, education, and service to promote the health of populations locally, nationally, and globally. Public health carries out its mission through organized, interdisciplinary efforts that address the physical, mental, and environmental health concerns of communities and populations at risk for disease and injury.
	<https://www.publichealth.med.upenn.edu/about-mph/>
* Graduate Certificate in Environmental Health Sciences
	+ The Certificate Program in Environmental Health Sciences (EHS) focuses on the mechanistic links that exist between environmental exposures, the molecular and cellular affects that ensue, and diseases of environmental etiology. Emphasis is placed on training in molecular toxicology, environmental and occupational health, molecular epidemiology, toxicogenomics, toxicoproteomics, and population-based and clinical/translational research. The goal is to explore mechanisms, pathogenesis, prevention and treatment of diseases of environmental etiology. This is achieved by working with world-renowned experts in lung and airway disease, cancer causation, neurodegenerative disease, reproductive and developmental disorders, and cardiovascular disease.
	<https://ceet.upenn.edu/training-career-development/environmental-health-sciences-certificate/>
* Graduate Certificate in Public Health
	+ The Public Health Certificate Program (PHCP) offers highly motivated, well-qualified doctoral candidates in Biomedical Graduate Studies an opportunity to experience the relationship between public health and biomedical research. Public health relies on a variety of disciplines, including environmental health research, but the foundation is biomedical research, whose fundamental goal is to acquire new knowledge about living things in order to help us understand how to treat diseases and improve health, with the ultimate goal of improving the public’s health.
	<https://www.med.upenn.edu/phcp/>

**Wharton School of Business**

* Master of Business Administration in Business, Energy, Environment, & Sustainability
	+ The MBA Major in Business, Energy, Environment and Sustainability (“BEES”) is designed to provide in-depth foundations for those interested in the complex relationships between business and the natural environment, management of environmental risks, and the business and economics of energy. Students choosing the BEES MBA Major will be ideally suited for the ever-expanding set of careers in sustainable business, energy companies, green investing, energy banking, consulting, the non-profit world, and the government. Students will gain insight into these challenges through an inter-disciplinary approach.
	<https://riskcenter.wharton.upenn.edu/mba-bees-major/>
* Undergraduate Concentration in Environmental Policy & Management
	+ The Undergraduate Concentration in Environmental Policy & Management is designed to provide in-depth foundations for those interested in the complex relationships between business and the natural environment, management of environmental risks, and the business and economics of energy. Students choosing this Concentration are therefore ideally suited for the ever-expanding set of careers in energy companies, clean-tech investing, energy banking, consulting, the non-profit world, and the government. Students will gain insight into these challenges through an inter-disciplinary approach.
	<https://riskcenter.wharton.upenn.edu/undergrad-enviro-concentration/>

**Cross-School**

* Graduate Certificate in Energy Management & Policy
	+ Penn graduate students who wish to earn the Certificate in Energy Management and Policy explore one of the three concentration tracks: Energy Markets, Risk, and Finance; Regional Energy Planning; or Energy Law and Policy. The certificate is centered around Penn’s Kleinman Center for Energy Policy giving students access to applied learning experiences.
	<https://kleinmanenergy.upenn.edu/education/certificate-program/>
* Minor in Sustainability & Environmental Management (SAS, SEAS, Wharton, Nursing)
	+ The Environmental Studies minor provides graduates with the necessary skills to contribute to society and effectively work on challenging problems that face humanity. Students acquire knowledge in environmental economics, environmental health, sustainability, renewable resources, and environmental management.
	<https://www.sas.upenn.edu/earth/minors/sustainability-and-environmental-management-minor>