# Tufts Programs with sustainability-focused learning outcomes or a sustainability-focused required course

* 387 undergraduate students total from the following departments within the School of Arts, Sciences, and Engineering. The part that is sustainability-focused is highlighted:
	+ [Environmental Engineering](https://engineering.tufts.edu/cee/current-students/undergraduate-program/majors/bachelor-science-environmental-engineering/program-objectives-and-outcomes-bseve) - *5 students*
	+ [Civil Engineering](https://engineering.tufts.edu/cee/current-students/undergraduate-program/majors/bachelor-science-civil-engineering/program-objectives-and-outcomes-bsce) – *15 students*

The BSCE and BSEVE student outcomes are modeled after those found in Criterion 3 of the ABET Engineering Accreditation Commission criteria. Each graduate of the BSCE program should be able to demonstrate:

* an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
* 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, social, environmental, and economic factors.
* an ability to communicate effectively with a range of audiences.
* 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.
* 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.
* an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
* an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.
	+ Biology – *152 students* (<https://tufts.app.box.com/v/as-learning-objectives>)
		- Knowledge base
			* An understanding of the major paradigms in biology, including evolution, cell theory, genetic inheritance, the central dogma, integration of living systems, and energy flow through ecosystems
			* An understanding of the relationship between genotype and phenotype
			* An understanding of the information flow between DNA, RNA, and proteins, and a basic knowledge of the processes that govern cellular function and division.
			* Familiarity with the processes through which evolution occurs, and an understanding that selection acts on multiple stages in the life cycle
			* An understanding of the dynamic nature of organismal development from inception through growth and differentiation, aging and death
			* Appreciation of the morphological, physiological, ecological, and behavioral diversity of life, and the importance of that diversity
			* Recognition that biological processes are based on chemical and physical principles, and that biology informs medicine, community health, food production, and environmental policy
	+ Environmental Studies – *36 students* (<https://tufts.app.box.com/v/as-learning-objectives>)
		- Overview:
			* Students majoring in Environmental Studies work with the science driving environmental processes, the interactions between technology and the environment, and the social and cultural dimensions of environmental preservation and improvement.
	+ Geological Sciences – *2 students* (<https://tufts.app.box.com/v/as-learning-objectives>)
		- **Fundamental Knowledge Requirements in Geology** *Students should be able to apply this information to actual field and laboratory situations.*
		- 1. Visual identification of common minerals, sediments, and rock types in outcrops, hand specimens, and under a microscope.
		- 2. Geologic time and the overall history of the Earth including the general evolution of organisms.
		- 3. The historical development of some major concepts in geology, and how thought processes and interpretations can change over time.
		- 4. Composition of the Earth, both its interior and crustal level materials and how they are formed including an appreciation of how igneous rocks form and how to interpret them.
		- 5. Structure of the Earth, both its interior and at the crustal level and how we know about this structure.
		- 6. Plate tectonics and how deformation and metamorphism occurs in Earth's crust as well as how to interpret metamorphic rocks.
		- 7. Earth's surface and near-surface processes including how they impact environmental and societal concerns, and how water is distributed, stored, and migrates in hydrologic systems.
		- 8. The fundamental ways in which soils, sediments, and sedimentary rocks are produced and how to interpret them.
		- 9. The Earth's climates and the history of climate change as recorded in geologic data/observations.
	+ International Relations – *160 students* (<https://tufts.app.box.com/v/as-learning-objectives>)
		- Students should be able to use fundamental concepts in the study of international relations. The fundamental concepts include:
			* o The major philosophical, theoretical and methodological approaches of the study of international relations from the perspective of political science including nationalism, sovereignty, power, conflict and interdependence.
			* o Economic analysis of commercial arrangements including trade, finance, development, comparative economic systems, health and the environment.
			* o The role of identities, values and prejudices that are the product of historical processes and the interaction of different peoples.
			* o Meta-narratives and theoretical frameworks for analyzing issues of cultural, religious and political life within societies and between political communities.
		- 3. Students should be able to apply the fundamental concepts of the study of international relations to a specific sub-field within international relations. Subfields include:
			* o Regional and comparative analysis from an historical, political economic and cultural perspective
			* o International economics including trade, finance, the environment and development
			* o Global health, nutrition and the environment
			* o International security
			* o Globalization
	+ Peace and Justice Studies – *11 students* (<https://tufts.app.box.com/v/as-learning-objectives>)
* Upon completion of the PJS major requirements students will be able to:
	+ 1. Demonstrate broad knowledge of the historical, theoretical and interdisciplinary development of the field.
	+ 2. Define basic concepts in peace studies, including positive and negative peace; structural violence, cultural violence, nonviolence, mediation, negotiation, and arbitration.
	+ 3. Define basic concepts in justice studies, including transitional justice, environmental justice, distributional justice, procedural justice, and accountability.
	+ 4. Define basic concepts in human rights and describe their history.
	+ 5. Demonstrate an understanding of the relationship between peace and justice.
	+ 6. Demonstrate an understanding of the different perspectives on conflict, including social, psychological, cultural, political, economic, environmental, religious, and historical.
	+ 7. Demonstrate an understanding of the causes of violence, including direct, structural, and cultural dimensions.
	+ 8. Demonstrate familiarity with the techniques of conflict resolution.
	+ 9. Demonstrate an ability to identify and analyze normative questions.
	+ 10. Demonstrate a capacity for assessing and evaluating competing points of view.
	+ 11. Identify and explain how people and groups act to promote peace and justice, including: the principled and pragmatic approaches to nonviolent action and the wide array of methods deployed; the dynamics and strategic interactions of contentious politics; and the social innovations in diverse forms and arenas of leadership, whether in civil society, institutions of governance, or political economy.
	+ 12. Develop strategies for nonviolent action on behalf of justice and peace, whether by community organizing, advocacy, movement mobilization, or deliberative civic engagement.
	+ 13. Demonstrate experiential learning skills for integrating coursework with internship and/or field research opportunities.
	+ 14. Demonstrate the ability to produce an integrative capstone product based on research (quantitative or qualitative) and/or civic engagement.
* The Graduate School of Arts and Sciences:
* MA/MA degrees in Urban and Environmental Policy and Planning – *25 students* (https://as.tufts.edu/uep/about/values-diversity)
	+ Urban and Environmental Policy and Planning Core Values
		- The inextricable linkages between social, economic and environmental issues and the ability to make policy and planning recommendations accordingly.
		- The role of values in public policy and planning formation, and the ethical/social responsibility of policy and planning professionals uphold these values.
		- The deeply embedded nature of race, class, gender and culture in all aspects of public policy and planning, and a commitment to fostering a diverse, inclusive, and welcoming culture.
		- The centrality of spatial, social, and environmental justice to all aspects of public policy and planning.
		- The role of individual and community rights and responsibilities in public policy and planning.
		- The development of sustainable communities by aligning the goals for a high quality of human life with respect for the limits of supporting ecosystems.
		- The influential roles of government, nonprofit, other civil society and market sector actors and the potential of cross-sector collaboration.
		- The commitment to meaningful and empowered community engagement in knowledge production, public policy and planning design, implementation, and evaluation.
		- The commitment to constructive, respectful, and compassionate dialogue across differences in terms of culture, discipline, professional affiliation, ideology, and other life experience, and the value of active listening with empathy and doing so with humility.
		- The commitment to integrity and honesty in public policy and planning analysis and knowledge production.
* MS/PhD degrees in Environmental and Civil Engineering – *20 students* (https://engineering.tufts.edu/cee/current-students/ms-and-combined-degree-program)

The graduate program outcomes for the MS programs in Civil and Environmental Engineering are:

* An ability to apply knowledge of technical skills when working in one of the tracks (applied data science, environmental health, environmental engineering and water resources, geosystems engineering, offshore wind energy, and structural engineering.
* Written and verbal communication of research and technical results.

Master's degrees require a minimum of 30 SHUs and the fulfillment of at least 10 courses at the 100-level or above with grades of S (satisfactory) or at least a B-.

The department offers the following MS degrees:

* [MS in Civil and Environmental Engineering](https://engineering.tufts.edu/cee/current-students/ms-and-combined-degree-program/ms-civil-and-environmental-engineering)
* [MS in Offshore Wind Energy Engineering](https://engineering.tufts.edu/cee/current-students/ms-and-combined-degree-program/ms-offshore-wind-energy-engineering)
* [MS in Bioengineering (Environmental Biotechnology track)](https://engineering.tufts.edu/bioengineering/tracks/environbiotechnology.htm)
* [Dual Degree Master's Program (with Tufts Gordon Institute)](https://gordon.tufts.edu/graduate/m-s-in-innovation-and-management/dual-degree)
* [Joint MS in Environmental Engineering Policy and Planning](https://as.tufts.edu/uep/programs/joint/engineering)
* The Friedman School of Nutrition and Policy:
	+ Master of Arts in Agriculture, Food and Environment at the Friedman School of Nutrition Science and Policy - *25 students* (<https://nutrition.tufts.edu/academics/degree-programs/agriculture-food-environment?tab=tabs-0-tabs_content-3>)
		- The Agriculture, Food and Environment (AFE) program fuses the disciplines of nutrition, sustainability, agricultural science, environmental studies, and public policy. Our students learn to evaluate the ecological, political, economic and social aspects of food production and distribution.
		- One of the required courses is “Economics of Agriculture and the Environment” (NUTR 341), listed as one of the sustainability-focused courses in AC-1.
	+ Certificate in Sustainable Agriculture and Food Systems – *8 students*
		- Students are required to take at least two of the following three courses, all of which are listed as sustainability-focused courses in AC-1:
			* “Sustainability on the Farm” (NUTC 261)
			* “Sustainable Food Systems & Markets” (NUTC 262)
			* “Sustainability and the Food Consumer” (NUTC 263)
* Cummings School of Veterinary Medicine:
	+ Master's in Conservation Medicine – *16 students*
		- One of the required courses is “Human Dimensions of Conservation Medicine” (MCM 586), listed as one of the sustainability-focused courses in AC-1.