

The Environment, Climate and Sustainability Program at Harvard College (ECS)

A Proposed New Pathway Concentration Structure

Prepared by the Membership of the undergraduate programs subcommittee of the Harvard Standing Committee on Climate Education

- Anne Harrington (History of Science, committee co-chair)
- Dustin Tingley (Government, committee co-chair, member Environmental Science and Public Policy concentration Board of Tutors, Deputy Vice Provost for Advances in Learning)
- Sarah Dimick (English)
- Missy Holbrook (Organismic and Evolutionary Biology, head of Environmental Science and Public Policy concentration)
- Peter Huybers (Chair of Earth and Planetary Sciences)
- Ian Miller (History)
- Frank Keutsch (Area Chair for Environmental Science and Engineering, Chemistry and Chemical Biology, Earth and Planetary Sciences)
- Jason Beckfield (Sociology)
- Karen Thornber (Comparative Literature and East Asian Languages and Civilizations)

Introduction

The challenges of responding to climate change and creating an environmentally sustainable world require grappling with a wide range of interlocking issues: scientific, technical, economic, political, cultural, and ethical. To meet these challenges, colleges and universities need to educate generations of future leaders who have been trained, not only in the methods and content of one preferred discipline, but in critical, cross-disciplinary thinking. Put another way, to solve the urgent environmental problems of our time, Harvard needs to train new kinds of citizen-leaders: scientifically-literate social scientists and humanists, humanistically-informed engineers, scientists who understand the challenges of translating facts into responsive policy, and more.

To this end, Harvard College proposes creating a new pathway concentration structure¹ whose goal is to

- provide students with a choice of structured and rigorous curricular pathways in the area of Climate, Environmental, and Sustainability, each designed to appeal to different strengths and interests
- give students multiple opportunities to cross disciplinary boundaries in ways that will allow them to become the interdisciplinary leaders of tomorrow
- give students multiple opportunities to feel a sense of common purpose and community with one another, whatever their disciplinary focus
- help students build connections between classroom work and needed work in the world.

Harvard currently has several concentrations that engage with climate change, environmental challenges and paths to sustainability. The interdisciplinary concentration *Environmental Science and Public Policy* requires students to gain both “an understanding of the underlying scientific and technical issues and an appreciation for the relevant economic, political, legal, historical and ethical dimensions.” The *Environmental Science and Engineering* concentration, based at the School of Engineering and Applied Science, asks students to become conversant with “perspectives from a diverse set of scientific disciplines including atmospheric physics and

¹ The idea of a “*pathway concentration*” would be new at Harvard College, but is well-known as a term and concept to Harvard Medical School and is widely used as a term in many of our peer institutions. The closest existing analog in Harvard College right now to what is being proposed here is the multi-departmental “track” program overseen by the Mind, Brain, Behavior Initiative. MBB, however, is not itself a concentration, but rather offers a way of enriching the curricular options available to students who choose to concentrate in one of the participating departments.

chemistry, oceanography, glaciology, hydrology, geophysics, ecology, and biogeochemistry.” The *Earth and Planetary Science* concentration, based in FAS, trains students in the physical sciences, and many of its courses relate to Climate, Environment, and Sustainability. Currently most natural science courses in FAS that are Climate, Environment, and Sustainability-related are listed as EPS courses. The humanities do not currently have a coherent concentration in this area.

This proposal below does not call for a new concentration structure that would compete with these existing programs; quite the contrary. We envision instead creating a collaborative concentration structure that brings together existing concentrations, respects and builds on the good work that has already happened, while at the same time leveraging and building bridges across, not just some, but all of the divisions in FAS and SEAS. The intellectual and pedagogical rationale for the proposed program is to provide and support multiple focused pathways through which students can pursue an academic trajectory that aligns with their interests and strengths, while at the same time building among them a sense of common purpose and interdisciplinary capacity.

Structurally, the Program is envisioned as being made up of a series of independent pathway concentrations (a new concentration category, described elsewhere in this document) and a set of common curricular and co-curricular requirements and offerings. Each pathway concentration would be independently managed, but the leadership of the pathways would also collectively govern and make decisions on behalf of a centralized coordinating structure (through the vehicle of an ECS Steering Committee). This centralized structure (provisionally named the “ECS Commons”) would be responsible for creating and overseeing the curriculum that knits the different pathway concentrations together into something greater than the sum of their parts (foundation courses, junior seminars, senior thesis workshops). The ECS Commons would also offer common co-curricular and administrative benefits that benefit all the pathways. Meanwhile, the ECS Steering Committee leadership would work together to advocate for resources for all elements of the program in ways designed to ensure that Harvard grows as a world leader in climate education.

The result is that students have the experience of being part of a vibrant interdisciplinary and cross-divisional community that respects the importance of both individual specialization and collaboration. Faculty have the experience of teaching and learning in a community of like-minded colleagues across Departments and Divisions who are committed, not just to the success of their pathway concentration, but to collaborating to create something more powerful than each could hope to realize on their own.

If successful, this new structure has the potential to be a moment of rare curricular innovation, not unlike when five social science departments – anthropology, economics, government, history, and sociology – came together in 1960 to create a new interdisciplinary concentration, Social Studies. Social Studies was created because a core group of faculty felt that requiring students to specialize narrowly in a single social science discipline made it difficult for them to engage intelligently with the pressing social problems of the day, from racism to nationalism to revolutionary movements. The experiment in collaboration was a success. Social Studies is today one of the most popular concentrations in the College, and it has helped to energize the curricular offerings of all the departments that contribute to it.

The pathways concentration structure being proposed here is likely to be no less energizing for its member departments, programs and communities.

The Proposal

The program in Environment, Climate and Sustainability Studies (ECS) would be anchored in three equally important elements: concentration pathways (with offerings across the sciences, engineering, humanities and social sciences), cross-disciplinary distribution courses, and interdisciplinary foundational and advanced seminars. More specifically, in this proposed concentration:

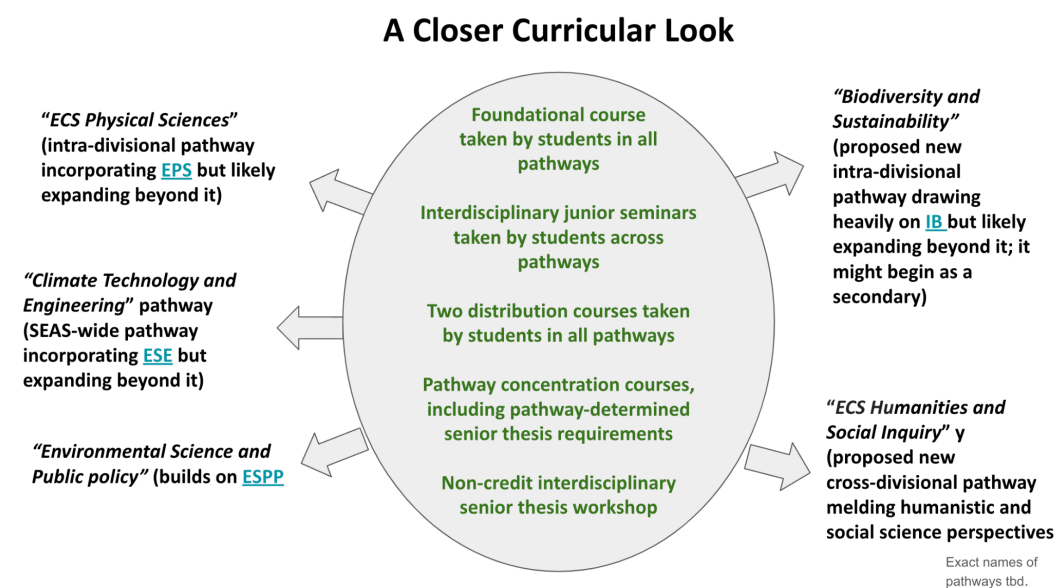
- Students would choose either one of four pathway concentrations or a possible fifth option offered as a secondary (final titles for all are provisional)
 - *An “ECS humanities and social inquiry” pathway*
 - *An “environmental sciences and public policy” pathway*
 - *An “ECS physical sciences” pathway*
 - *A “climate technology and engineering” pathway*
 - *A “biodiversity and sustainability” secondary (which will likely grow into a pathway concentration)*
 -
- Students would then fulfill the **eight-course** requirements of each pathway, including any pathway-specific cross-disciplinary courses. All requirements for the proposed secondary are pending.
- Students, regardless of their chosen pathway, would take **two** interdisciplinary courses together: an interdisciplinary foundation course in (usually) their freshman or

sophomore year and a discussion-based interdisciplinary seminar in their junior year, open only to concentrators.

- Students, regardless of their chosen pathway, would also take **two** distribution courses in an area outside of their pathway *and* outside the pathway most adjacent to their own.
- Finally, if they choose to pursue honors, students in all pathways would be required to participate in a **non-credit all-pathways senior thesis research workshop** in the fall of their senior year, at which they would present their work in progress to one another
- Students from all pathways would be encouraged to participate in a robust community-building program, of which the highlight would be a spring senior thesis research festival. The program would also sponsor career recruiting fairs, social events, excursions, facilitated discussions linked to on-campus lectures, peer mentoring opportunities, and more. Students in other concentrations would be welcome to benefit from the community-building offerings of the ECS.

A structure of this sort would establish Harvard as a leader in undergraduate education internationally. It is powerfully aligned with recommendations from the University report on [The Future of Climate Education at Harvard](#). This type of structure would also likely serve as a focus for new programmatic and fundraising support from donors. New faculty hires in this area would also find a model like this to be attractive – i.e. the ECS program would act as a significant recruitment tool.

Figure 1: Concentration Structure



Curricular Template

Courses outside of pathway (4 courses)

- Foundational intro courses, from a menu of options (1 course)
- Distribution courses, from a menu of options tailored to different pathways (2 courses)
- Interdisciplinary junior-year seminars (1 course)

Pathway courses (8 courses)

- Tutorial, research methods, studio, or lab courses (2 courses)
- Courses organized around a specific topic, problem, or domain. Students will take primary responsibility for developing their “focus”, in consultation with an advisor. Some of the final courses will likely cross disciplinary and divisional lines. (4 courses)
- Elective courses (2 courses).

Note: In the STEM pathways especially, some students may need to complete basic math and statistics courses (for example) before they are ready to fulfill all of their concentration requirements. Such preparatory courses will normally not be included in the concentration course count, but the program will be committed to making every pathway accessible to all students, regardless of previous training.

Honors option (2 courses, plus non-credit expectations)

- Senior thesis (fall)
- Senior thesis (spring)
- Mandatory non-credit senior thesis workshops, which meet roughly monthly over a meal, and bring thesis writing students from all pathways together to share their research in progress (fall)
- All-concentration senior thesis research festival (late spring)—not mandatory but encouraged

Total # of courses for all non-honors pathways: 12

Total # of courses for all honors pathways: 14

Timeline (and why we shouldn't wait)

Some might worry that we don't yet have the capacity to mount such a program and that we should concentrate instead on making a series of new strategic hires first. We disagree. On

moral grounds, it seems to us that the work is ours to do now, and we should not expect imagined future hires to sort things out for us, while we hope for the best. On practical grounds, it also seems to us that there is in fact ample capacity right now to begin this work (and beginning is all we can do). For this reason, even as we assume that new courses will be created and new faculty will be hired to support these different pathways once we have launched, we have created a series of curated lists of existing courses we could use to populate the different elements of this proposed pathway concentration. The results should make clear that our curricular offerings are sufficiently robust to launch this pathway concentration **right now**, and will only get better once the program is underway and we can discern more fully the unmet needs.

Courses in common

Sample Foundational Courses (1 course)

Foundational courses are broad and interdisciplinary courses taken in the first or sophomore year of college by all students considering one or another pathway concentration. They are problem-centered courses that aim to expose students to a wide range of approaches and ways of thinking around climate, environment and sustainability topics.

We expect a new steering committee to refine the pedagogical goals of these foundational courses, a process that will then allow our faculty to create new home-grown foundational courses, and potentially adapt some existing ones.

The courses listed below give some sense of current offerings that could serve as a **starting point** for that work.

1. GENED 1094 Confronting Climate Change: A Foundation in Science, Technology, and Politics
2. GENED 1018 How to Build a Habitable Planet
3. GENED 1167 Climate Crossroads
4. GENED 1085 Energy Resources and the Environment
5. GENED 1137 The Challenge of Human-Induced Climate Change: Transitioning to a Post Fossil Fuel Future
6. GENED 1158: Water and the Environment

New Course under Consideration

1. WICKED PROBLEMS (a first-year full course, in development, centering environmental challenges of our time and their entanglement with other fraught challenges, that draws on perspectives across the social sciences)

Sample Distribution Courses (2 courses)

Distribution courses aim to expose students to perspectives and scholarship in pathways outside their own, and also not directly adjacent to their own. The goal of distribution courses is less specifically to train students to do interdisciplinary work specific to their pathways (since the pathways themselves will each have their own strategic interdisciplinary vision). Rather, the primary goal is to cultivate an understanding of (and respect for) the different kinds of approaches taken towards climate, environmentalism and sustainability across disciplines and divisions. In this way, all students from this concentration, regardless of their pathway, will leave Harvard with a grounded appreciation for the ways that the environmental and sustainability problems that face our world require creative collaboration and rigorous exchange of ideas and concerns.

As a rule, approved distribution courses would not have prerequisites (though there may be exceptions for some students).

Sample options for the pathways in: (1) ECS Physical Sciences, (2) Climate Technology and Engineering

1. ESPP 77: Technology, Environment, and Society
2. SOCIOL 1102: Environmental Sociology
3. SOCIOL 98BG: Climate Sociology
4. ECON 1661: Economics of Climate Change and Environmental Policy
5. EMR 160: Environmental Practices and Indigenous Knowledge Systems
6. Gov 1722 Politics of Climate Change and the Environment
7. RELIGION 1046 Introduction to Religion and Ecology
8. HISTSCI 1980: Burning Books, Fighting Facts: How Individuals & Institutions Resist, Reject, and Destroy Knowledge
9. MIT 11 .422: Law, Technology, and Public Policy
10. ESPP 78 Environmental Politics

New Courses under Consideration

1. Institutional Foundations of Climate and Environment Public Policy

2. Introduction to Environmental Humanities
3. Foundations of Environmental Justice

Note: To fulfill their pathway distribution requirement, students in these three STEM pathways will be required to take one appropriate course in a social science discipline and one appropriate course in a humanities discipline.

Sample options for the pathways in: (1) ECS Humanities and Social Inquiry, and (2) ECS Public Policy

1. ESE 101 Global Warming Science
2. EPS 109 Earth Resources and the Environment
3. EPS 134 Climate Change Debates: The Reading Course
4. OEB 120: Plants and Climate
5. OEB 65 Conservation biology
6. OEB 55: Ecology: Populations, Communities, and Ecosystems
7. OEB 10: Foundations of Biological Diversity
8. Research at the Harvard Forest—Global Change Ecology

Note: To fulfill their distribution requirement, students in the policy and humanities/social inquiry pathways will be required to take one appropriate course in either two distinct science areas (e.g., life science and physical sciences), or one appropriate course in a single science area and one course in engineering. All the courses can double-count for the Harvard College distribution requirement.

Pathway Concentration Courses

The ECS program would offer a range of concentration pathways centered in the sciences; engineering; humanities and critical social inquiry; and public policy.

Pathway courses offer students a chance to develop depth in the methods, animating questions and critical content of one or another coherent approach in the climate, environmental and sustainability area.

While each pathway concentration is intellectually grounded in a particular form of inquiry, most pathways will also ask their students to cross disciplines and divisions, to ensure they have the requisite training to do their best work. Any such interdisciplinary expectation would be

distinct from the concentration-wide distribution requirement, though it may sometimes overlap with it.

The responsibility for determining the specific curricular requirements of each pathway concentration is the responsibility of Pathway Directors and Pathway Boards (see *Proposed Administrative Structure* below).

ALL COURSES LISTED BELOW ARE FOR EXEMPLARY PURPOSES ONLY .

Sample “Humanities and Social Inquiry” Pathway courses

1. ENGLISH 186CC: Climate Change Literature
2. HIST-LIT 90GC: Race and the Environment in the Atlantic World
3. HIST-LIT 90GC: Climate Change and the Global South
4. COMPLIT 274: Politics of Aesthetics: New Materialisms and Environmental Humanities
5. ENGLISH 90T: Toxic Rhetoric
6. BETH 722: Environmental Ethics and Justice (available for college cross-registration)
7. EMR 151: Quechua, Indigenous Language Revitalization and Global Indigeneity
8. SES 5409: Climate Justice (available for college cross-registration)
9. AFVS 160: Modernization in the Visual United States Environment, 1890-2035
10. ENGLISH 190VE: Voices of Environmental Justice
11. VIS 2314: Responsive Environments
12. SCI 6244: Climate by Design
13. RELIGION 1046 Introduction to Religion and Ecology
14. History 15Q: Australian Environmental History: Gondwana to Global Warming
15. History 15W: Warzone Earth: Environmental Histories of War
16. HIST 1973: Re-Wilding Harvard
17. HLS 3248: Rights of Nature

New Courses under Consideration

1. Introduction to Environmental Humanities
2. Foundations in Environmental Justice
3. Current Topics in Environmental Humanities
4. Urban Ecologies
5. Intersections of Environmental and Health Humanities

Sample “Public Policy” Pathway Courses

1. ESPP 77: Technology, Environment, Society
2. ESPP 160: US Environmental Policy and Policymaking
3. ESPP 180: Climate Change, Health, and Environmental Justice-Focusing on Solutions
4. ESPP 78: Environmental Politics
5. ECON 1661: Economics of Climate Change and Environmental Policy
6. SOCIOL 1102: Environmental Sociology
7. SOCIOL 1110: Public Health and Environmental Injustice
8. SOCIOL 98BG: Climate Sociology
9. GOV 1722: Politics of the Environment and Climate Change
10. HISTSCI 2985: Science, Power, and Politics
11. HISTSCI 1385: Water: The Politics and Uncertain Futures of Drought and Climate Change
12. HLS 2025: Climate and Energy Law and Policy
13. EMR 160: Environmental Practices and Indigenous Knowledge Systems
14. MIT 11.422: Law, Technology, and Public Policy
15. API 165: Energy and Environmental Economics and Policy
16. GH 72: Climate Change and Global Health Equity
17. SUP 663: Land Use and Environmental Law

New Courses under Consideration

1. Institutional Foundations of Climate, Environmental, and Sustainability Policy
2. Data Science for Climate, Environmental, and Sustainability Policy

Sample “Physical Sciences” Pathway Courses

- 1) EPS-ESE 6 Introduction to Environmental Science and Engineering
- 2) EPS 50 The Fluid Earth: Oceans, Atmosphere, Climate, and Environment
- 3) EPS 53 Marine Geochemistry
- 4) EPS-OEB 56 The History and Evolution of Life on Earth
- 5) EPS-ESE 101 Global Warming Science 101
- 6) EPS/ESE 102 Data Analysis and Statistical Inference in the Earth and Environmental Sciences
- 7) EPS/ES 112 Thermodynamics
- 8) EPS/ESE 132 Introduction to Meteorology and Climate
- 9) EPS/ESE 138 Mysteries of Climate Dynamics
- 10) EPS 139 Paleoclimate as Prologue

- 11) EPS 168 Human environmental data science
- 12) EPS 169 Seminar on Global Pollution
- 13) EPS 187 Biogeochemistry
- 14) ESPP 77 Technology, Environment, and Society
- 15) ESE 109 Earth Resources and the Environment
- 16) ESE 162 Hydrology
- 17) ESE 129 Climate and Atmospheric Physics Laboratory
- 18) ESE 131 Introduction to Physical Oceanography and Climate
- 19) ESE 133 Atmospheric Chemistry

Sample “Biodiversity and Sustainability” Pathway Courses

- 1) OEB 120: Plants and Climate
- 2) OEB 10 Foundations of Biological Diversity
- 3) OEB 60: Fundamentals of Marine Biology
- 4) OEB 56 Conservation Biology
- 5) MIT 1 .018 TBA2: Fundamentals of Ecology
- 6) OEB 55: Ecology: Populations, Communities, and Ecosystems
- 7) FYRSEM: Research at the Harvard Forest—Global Change Ecology
- 8) HEB 1367: African Climate: Earth's history, humanity's future
- 9) E-PSCI 53: Marine Geochemistry
- 10) OEB Global Change Biology
- 11) ESPP 90W: Global Wetlands: Boundary-spanning ecosystems for science, social justice, and public policy
- 12) E-PSCI 53: Marine Geochemistry
- 13) MIT 12 .007: Geobiology: History of Life on Earth
- 14) EPS 56 The History and Evolution of Life on Earth

Sample “Climate Technology and Engineering” pathway courses

1. Engineering ESE 164: Environmental Chemistry
2. ESE-112/181, Thermodynamics by Case Study/Engineering Thermodynamics`
3. ESE/EPS 102 Data Analysis and Statistical inference in the Earth and Environmental Sciences
4. ESE 109 Earth Resources and the Environment
5. ESE 161 Applied Environmental Toxicology
6. ESE 163 Pollution Control in Aquatic Ecosystems
7. ESE 164 Environmental Chemistry

8. ESE 161: Applied Environmental Toxicology
9. ESE 166: State of the art instrumentation
10. ES 248 Electrochemistry in Energy Materials
11. ES 192 Materials Selection and Design
12. Physics 129: Energy Science
13. SCI 6121/6122 Environmental Systems 1/2
14. CS 109 Data Science
15. ENG-SCI: Integrative Frameworks for Technology, Environment, and Society I
16. MIT 1 .38 : Engineering Geology
17. PRO MIT 2 .814 : Exploring Sustainability at Different Scales
18. MIT 10 .391: Sustainable Energy

Sample Interdisciplinary Junior Seminars

Interdisciplinary junior seminars will bring students from all pathways together in their junior year. The seminars will be designed to engage students on cases or problems that require them to engage with one another across their different disciplines and divisions. Many seminars will also have an engaged scholarship or experiential learning element.

We currently do not have any courses in our catalog that fully achieve the pedagogical vision we have for this element of the program, but we look forward to recruiting faculty to develop and teach new offerings. Responsibility for this work falls to the ECS Steering Committee (see proposed *Administrative Structure* below).

ESPP currently has an interdisciplinary junior seminar program that does capture much of the spirit of what the ECS junior seminar program aspires to; here are the titles of some of their current curricular offerings:

1. ESPP 90g The Law and Policy of Climate Change: Influencing Decision Makers
2. ESPP 90h Climate, Crops, and Commonwealth
3. ESPP 90m Natural Climate Solutions: Feasible or Fantasy?
4. ESPP 90n Addressing the Global Climate Crisis: Challenges for Both Developed and Developing Economies
5. ESPP 90p Climate Responsibility and Climate Action
6. ESPP 90s The Technology, Economics, and Public Policy of Renewable Energy

Possible New Courses

These courses simply reflect brainstormed ideas, not actual course proposals.

1. ECS: 90x Policy and Science of Methane Detection and Well Capping
2. ECS 90x Energy Identities: From Appalachia to Wyoming to Silicon Valley
3. ECS 90x Evaluating Department of Energy Project Proposals and Investments
4. ECS 90x Music of the Anthropocene: Critical and Practical Perspectives
5. ECS 90x Wake of the Flood: Designing Flood Resilience for Massachusetts and Beyond
6. ECS 90x Here Comes Sunshine: Culturally Sensitive and Science-Based Approaches to Massive Solar Energy Rollout

Proposed Administrative Structure

Below we lay out what the administrative structure might look like. We note that there are existing administrative structures and staff to be drawn on that are part of existing concentrations and programs. This will minimize the extent of additional administrative costs beyond the status quo.

Central coordination

ECS Steering Committee: The well-being and delivery of the concentration program as a whole is the responsibility of a steering committee. The committee is chaired by an ECS Director (*see below*), and is additionally composed of the leadership of the pathway concentrations (*see below*). Several at-large additional members may also be appointed (including faculty outside of FAS/SEAS), normally for a maximum of nine members. In addition to ensuring the integrity of the concentration as a whole, the ECS steering committee is tasked to review lists of foundation courses and distribution courses, and to ensure the successful development and delivery of all home-grown interdisciplinary seminars and non-credit senior thesis seminars (the “ECS curricular commons”). The Steering Committee will also be charged with creating meaningful opportunities for discussions, brainstorming, and collaboration among faculty and staff participating in the different pathways of this program (*see also Additional Administrative Considerations below*).

Finally, the ECS Steering Committee will act as a robust champion to the Deans for the resource needs of both the ECS program as a whole and its constituent pathways. To this end, the ECS Steering Committee Director will work with the five Pathway Directors each year to produce an annual budgetary request addressed to the three Divisional Deans, the Dean of SEAS, and the Dean of FAS. The ECS Director will also work with the five Pathway Directors to propose

priorities for future FAS/SEAS plans and fund-raising in the area of climate education, including new faculty lines.

ECS Director: The ECS Director role will be a rotating position held by each occupant for a maximum three-year term. The ECS Director's primary responsibility will be to chair the steering committee, identify issues that need to be brought to its attention and translate its decisions into action items. To do this work, they will work closely with the ECS Program Manager (*see below*). The Director is appointed by the Dean of FAS, in consultation with the Steering Committee. Candidates for this position will normally be senior faculty drawn from the Steering Committee membership.

ECS Program Manager: The individual holding this role will work closely with the ECS Director in developing the agendas for the steering committee, and will serve in a non-voting capacity on that committee. They will be additionally responsible for following up on issues emerging from those meetings and implementing curricular policies. Finally, they will be expected to take the lead in setting up the fall senior thesis workshops and the spring senior thesis research festival.

Pathway governance and faculty engagement

Pathway concentration hosting: Different pathway concentrations will be directly managed by a mix of departments (e.g., EPS, OEB), existing self-standing concentration boards (e.g. ESPP) and newly formed intra-divisional and interdivisional curricular committees. These different entities will be responsible for reviewing and approving their curriculum, identifying gaps in said curriculum, and seeking relevant redress (including requests for new faculty hires). They will also be responsible for setting policy, and troubleshooting issues within their arm of the program as they arise. All pathway faculty leaders serve on the ECS steering committee(*see above*).

Pathway concentrations differ from self-standing concentrations, however, because they each are supported by and contribute to the larger ECS collaborative program. For this reason, we propose a new governance model for understanding the relationship between the department and the pathway concentration: **pathway concentration hosting**. No department or program “owns” a particular pathway concentration, but rather acts as its “host.”

The language of “hosting” is both a way to recognize the unique collaborative structure we are creating with this program *and* a way for FAS and the Divisional Deans to recognize and reward other kinds of contributions to pathways made by departments outside the “host department.” There are at least three other ways that non-hosting departments might be formally recognized for their contributions::

- (1) **pathway primary contributors** are departments or programs that contribute courses that count for a particular pathway, and that also do substantial senior thesis advising, sit on curricular committees, and so on;
- (2) **pathway secondary contributors** are departments or programs that contribute courses that count for the pathway.
- (3) **ECS primary contributors**: are departments or programs that contribute courses to the ECS curricular “commons”: foundational courses, interdisciplinary junior seminars, and senior thesis workshops.

Additional Administrative Considerations

Resources for new administrative support: This program will need an initial investment of administrative labor and resources to create a multi-pronged web presence, develop programming to promote itself in Visitas and during first and second-year orientation programming, and support the calendaring and staffing of six committees (steering committee and five pathway subcommittees)

Space considerations: The administrative and community-building hub could be located at the current Harvard University Center for the Environment (28 Oxford St.) which has social space, seminar room, and office space.

Collaboration with the Salata Institute: The Salata Institute is in a unique position to support this concentration pathway program by making available its university-wide network of potential faculty mentors to concentrators, serving as a clearing house for research opportunities for students, organizing community-building events that bring together students and faculty, collaborating with the Mignogne Center on career exploration workshops, and more. The ECS Steering Committee, based in FAS, should explore, in consultation with the FAS dean, how best to take advantage of this partnership and clarify its formal or informal relationship to the concentration.

An external advisory committee: We suggest that the ECS program as a whole should be both supported by and made accountable to a strong external advisory committee. It should be the responsibility of the Dean of FAS to constitute this committee.

Concentration title on student transcript: For the sake of ensuring that the distinctive training of each student is legible to future employers and professional schools, we suggest that, on student transcripts, the concentration pathway name should lead, followed by the common program name: e.g., “Engineering Sciences: Environment, Climate and Sustainability Studies”, or “Public Policy: Environment, Climate, and Sustainability Studies”

Constitutional Provisions

- Each program member agrees to the curricular structure laid out in the current proposal, including the requirement that all students must take four courses designed to build cross-disciplinary and cross-divisional understanding and respect for different analytic and methodological approaches: one interdisciplinary foundational course, one interdisciplinary junior seminar, and two distribution courses. *Because these four courses are required for students in each participating pathway concentration, the number of pathway-specific courses over which each concentration has autonomy is limited to eight (given FAS rules about concentration requirements).* Students wishing or needing to take a greater number of advanced courses in order, for example, to prepare for graduate school can be advised on potential secondaries that they may pursue alongside their primary pathway concentration.
- Each program member agrees to the collaborative governance structure outlined in this proposal and agrees to work in good faith with other pathway concentration heads to ensure the flourishing of the program as a whole.
- Each program member agrees to advocate for curricular and community-building resources collaboratively rather than competitively. Like a union, the vision here is that we are stronger if we work together.
- FAS/SEAS leadership commits to actively supporting the collaborative vision and especially the goal of growing the whole program collaboratively and avoiding pathway concentration-level zero-sum thinking.
- The program agrees to a process of external evaluation, the details of which remain to be determined, designed to trouble-shoot, course-correct and benchmark progress on shared goals.