Environmental Solutions Initiative

Environment & Sustainability Minor Community Meeting #1

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Executive Director Amanda Graham, PhD

23 May 2016

ENVIRONMENTAL SOLUTIONS INITIATIVE

Today's Agenda

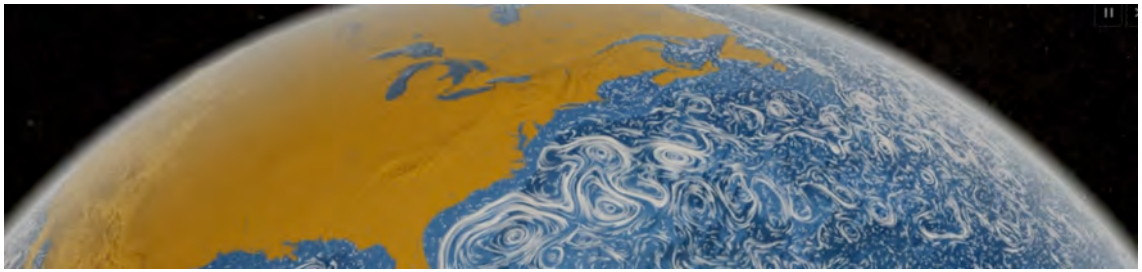
1. Welcome, brief introductions
2. Short history and background, including guiding principles
3. A possible curriculum model
4. Discussion

Environmental Solutions Initiative

Research

Education

Convening



ESI Education

Environment and Sustainability Minor

GIR Environment

Environmental Solutions Action Corps

Designing MIT's minor in environment/sustainability

1. Short history and background
2. Guiding principles
3. Environment/sustainability subject review
4. Curriculum models

FENS MIT FACULTY ENVIRONMENTAL NETWORK FOR SUSTAINABILITY

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The Project Requirement

Any student enrolled in the Undergraduate Minor will be required to complete a 12-unit project requirement. The project requirement reflects MIT's commitment to hands-on learning as a complement to classroom study. This can be accomplished in several ways. First, a student can take a field studies or laboratory class. Possibilities include: **12.120** (Environmental Earth Science Field Course), **12.159** (Sedimentary and Surficial Geology Investigations), **12.119** (Analysis of Environmental Materials), **12.335** (Experimental Atmospheric Chemistry), **1.101** (Introduction to Civil and Environmental Engineering Design I), **1.102** (Introduction to Civil and Environmental Engineering Design II), **1.106** (Environmental Fluid Transport Processes and Hydrology Laboratory), and **1.107** (Environmental Chemistry and Biology Laboratory).

Second, a student can complete one or more UROP projects (for which they receive 12 units of credit) as long as these assignments incorporate the preparation of a reflective paper reflecting on the experience of applying the ideas and methods they have learned in the Minor. The same might hold for a summer internship followed by an independent study focused on a faculty-guided review of the student's internship experience applying what they learned in the Minor.

Third, a student could complete a thesis with an Environment and Sustainability theme (presumably as part of their Major) as long as their thesis involves first-hand data gathering and includes an effort to think through the implications of theory for practice.

If a student prefers to complete this requirement under the direction of a faculty member from outside their Major department, he or she can request assistance from the new Institute-wide Environment and Sustainability Council to identify an appropriate faculty advisor or gain admittance to a project-related course or a research activity in another department. If students completing a thesis or a project in their home department want help identifying additional faculty members to guide their theses or finding appropriate UROP projects, the Council will help identify faculty from the FENS membership list willing to play this role.

The Public Service Center (PSC) can serve as a resource for students enrolled in the Undergraduate Minor to identify and complete their hands on experience. The Service Learning Program can support students and faculty with the incorporation of projects directly into courses, with approval from the Environment and Sustainability Council. Additionally, students can apply for PSC Fellowships and Internships to work on capacity building service projects around the world. Finally, field work may be supported through other PSC programs, including the IDEAS Competition and PSC grants. Projects reflecting the Environment and Sustainability theme may fulfill the field study requirement.

Proposed Undergraduate Minor in Environment and Sustainability

Last updated 3/12/10 at 2:37pm

Summary

The inventory of environmental subjects currently listed on the relevant OpenCourseWare page is impressive. But, we need to create new educational pathways through the Institute, adopt an explicit curriculum framework, and take full advantage of our teaching resources. We are confident that we can harness existing faculty capabilities and integrate the many disparate teaching efforts scattered across the Institute by re-organizing our current academic offerings. With only the modest addition of one or two new core subjects (and the appointment of one new faculty member) we think MIT will be able to offer an exciting and educationally compelling program matching anything in the Environment and Sustainability field currently offered by comparable academic institutions (even though we are advocating a minor rather than a major).

While some universities have opted to create Environment and Sustainability majors, (or even departments and schools), it makes more sense at MIT, given our approach to undergraduate education, to encourage students to add a minor. At MIT, undergraduate majors are expected to delve deeply into a single field (often completing some graduate level coursework). To broaden what students learn–without contradicting our desired focus on in-depth learning in a single discipline or department–MIT encourages students to add a thematic or cross-cutting minor as well (although some students take a second major).

N.B. For an inventory of what our competitors are doing in this field (see pages 17–24 of the 2007 Zuber Committee Report, "Creating a Sustainable Earth: An MIT Research, Teaching and Public Service Initiative for Understanding, Restoring and Managing the Earth".

The recent Report of the MIT Environmental Research Council (Prospectus for an Initiative on Global Environment at MIT) identifies "six inaugural areas of research emphasis" that MIT hopes to build up in the future: (1) Future of the Oceans; (2) Ecosystem Resilience; (3) Changing Climate; (4) Rethinking Water; (5) Sustainable Cities; and (6) Synthetics in the Environment. We want the new Minor in Environment and Sustainability to support and benefit from this research thrust. We suggest three ways of accomplishing this. First, we intend for the curriculum in the Environment and Sustainability Minor to prepare students to work effectively as members of research teams in these priority areas (through UROP, or as undergraduate RAs or as graduate students if they continue their studies at MIT). So, we have tried to ensure that the key elements of the curriculum in the Minor dovetail with the six priority areas that will shape the Institute's research agenda. Second, we want to be sure that faculty members working in each of these areas incorporate what they learn into the classes included in the Undergraduate Minor. Finally, we suggest that the governance of MIT's Global Environmental Initiative be closely linked with faculty oversight of the new Minor.

The Undergraduate Minor we are proposing includes (1) five transdisciplinary core subjects (of which students will be required to complete three) or 36 units, (2) three classes from one of nine sub-specialties built around sets of existing subjects covering important themes (a minimum of 27 units), and (3) a 12-unit project requirement that can be met in a number of ways.

The subjects in the core represent five of the basic elements of the emerging sustainability science field: terrestrial and aquatic ecology; climate and oceans; institutions, markets and the management of common pool resources; public health; and the design of sustainable cities in an urbanizing environment. These will provide students with the initial

Terrascope: Th

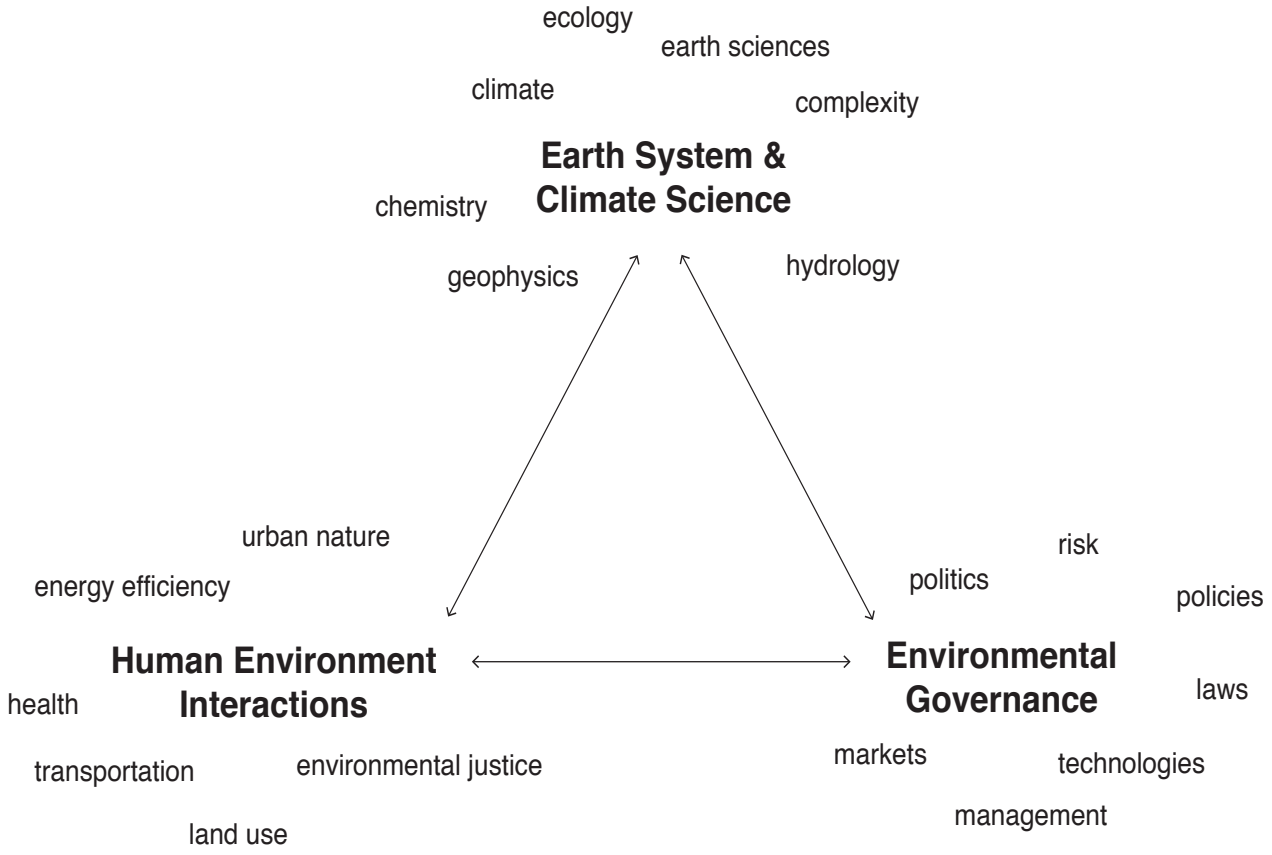
Terrascope is a freshman learning community in w environmental problems and to communicate about formats. In addition to learning how to acquire the s problems, Terrascope students develop an apprec sustainability issues. They also learn how to comm including scientists, politicians, and the general pub disciplines across the Institute, where they exhibit issues. Thus, we assume that Terrascope might be Minor in Environment and Sustainability. Students in Terrascope Program.

The Terrascope academic program is centered on (Design for Complex Environmental Issues), and SI

12.000, Solving Complex Problems, also known as students are presented with a real-world problem by a purely scientific or technical solution. The clas problem, work together as a team, and integrate in semester the students, as a group, must come up communicate that solution via a comprehensive we panel of experts brought to MIT for the occasion, a public. The presentation is webcast live and archiv

1.016, Design for Complex Environmental Issues (S Terrascope students' learning experience, both in process, while giving them experience in designing split into multiple teams, each one focused on some They pursue that specialized area in detail, develop depending on the nature of each team's focus. The Lobby 13) into a "marketplace of ideas," in which e with context about the nature and extent of the lar presentations take place in an open, public event, members of the MIT community and the general pul

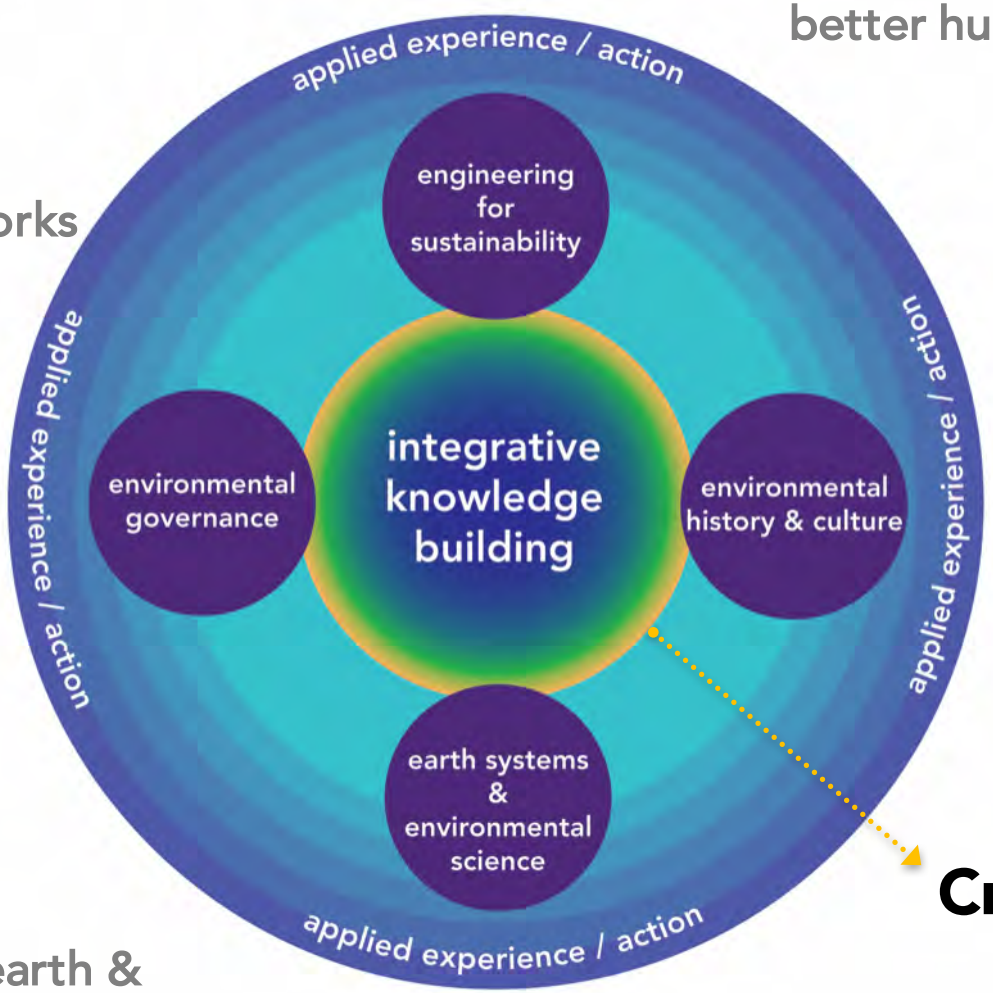
Silbey/Glasmeier 2011



ESI 2015-16

How do we design technology for better human/environment futures?

What political & economic frameworks govern human/ environment interaction?



What drives & inspires humanity's relationship with nature?

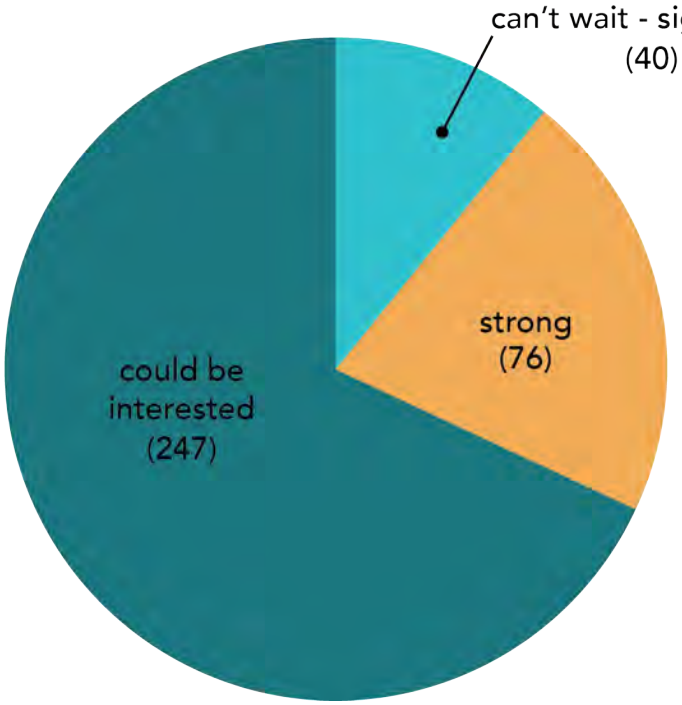
How do our earth & atmospheric systems work?

Craft pathways toward a sustainable society

Survey highlights (I)

- 891 responses
- Strong interest E & S as part of academics (60%) and for career (>50%)
- Significant interest in E & S minor (>40%)

Q5. How strong is your interest in pursuing a multidisciplinary minor in environment/sustainability?

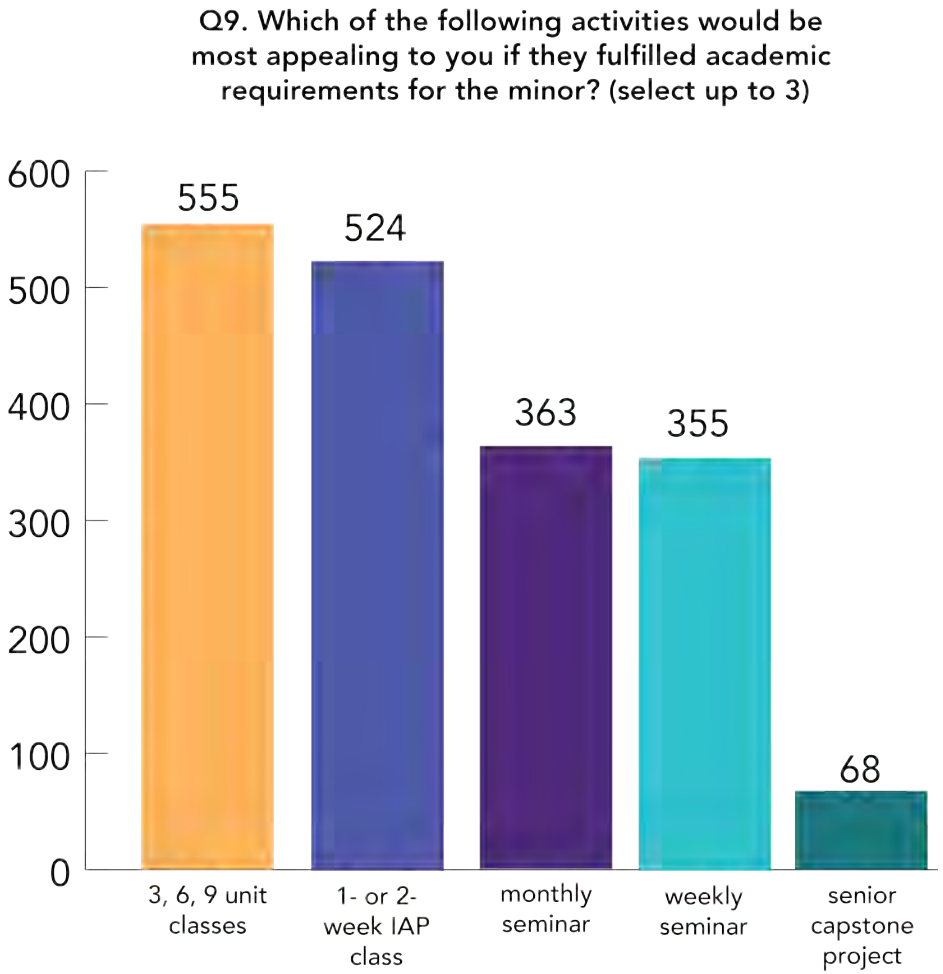


(out of 872 total responses)

Survey highlights (II)

- Consistent interest in four pillars

Survey highlights (III)



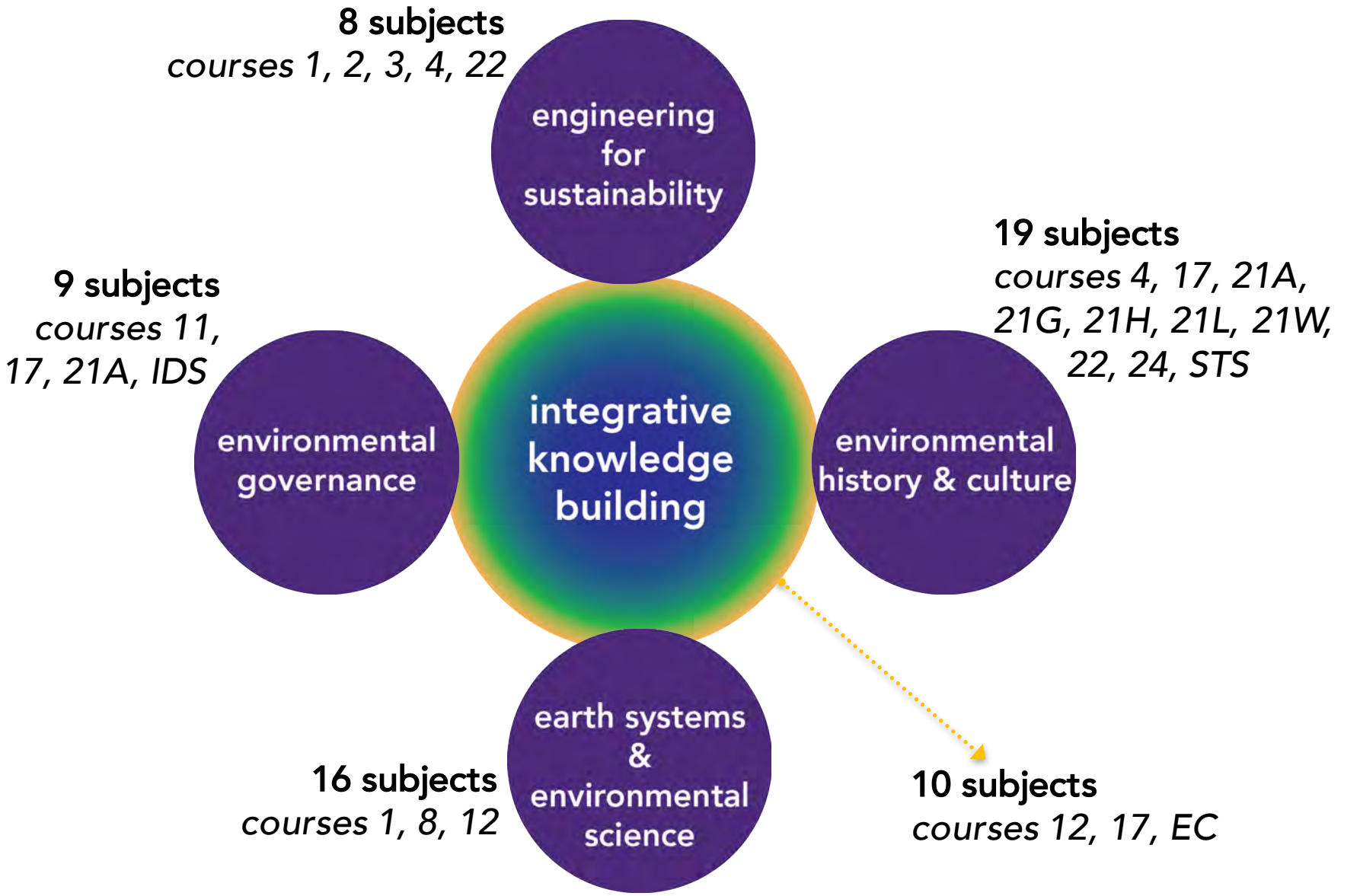
Guiding principles for interdisciplinary minors

1. 5-7 subjects
2. No hidden pre-requisites
3. Simple, transparent, flexible curriculum model
4. Clear integrative component

Review of environment & sustainability subjects today

- Undergrad subject number
- Segregated those without pre-reqs (other than GIRs/POI)
- Not including those "not offered regularly"

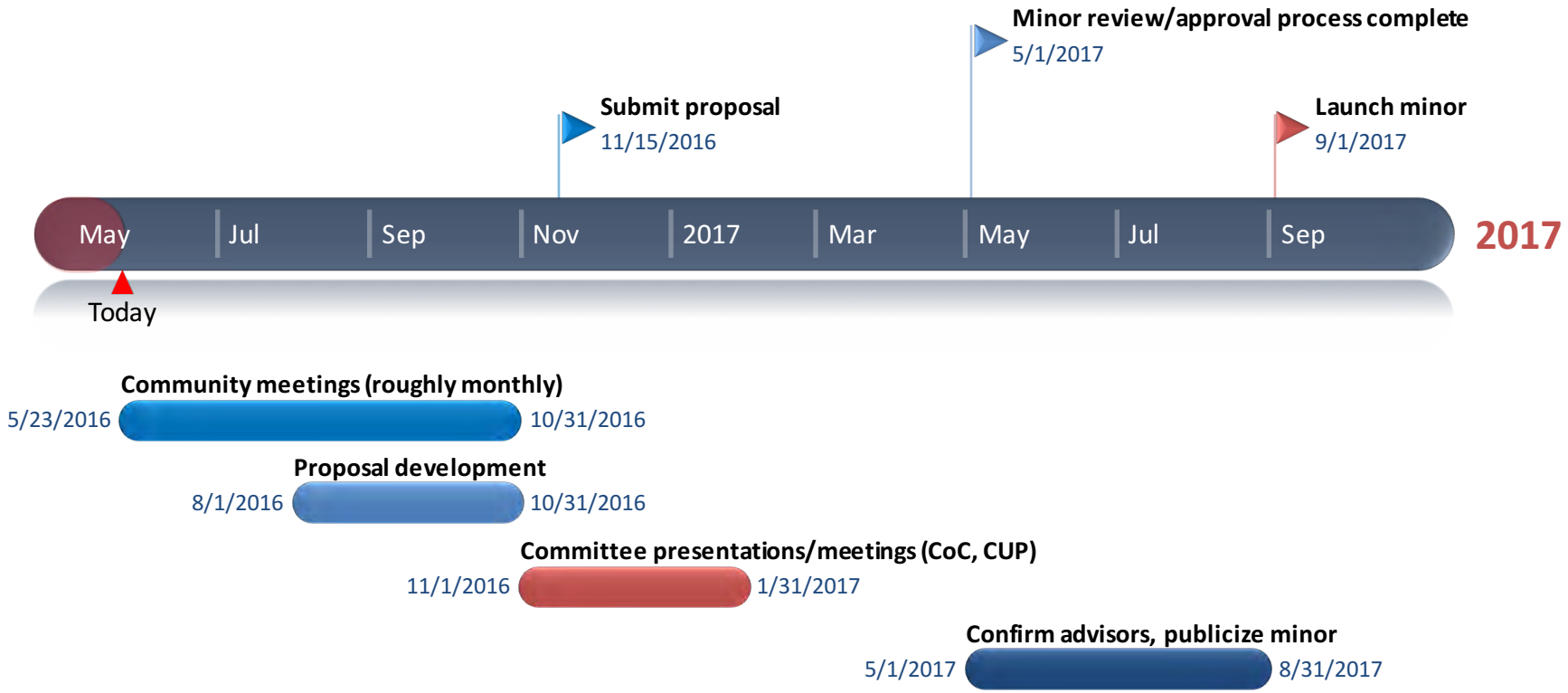
With these criteria: 62 total subjects


8 subjects
courses 1, 2, 3, 4, 22
engineering for sustainability
19 subjects
courses 4, 17, 21A, 21G, 21H, 21L, 21W, 22, 24, STS
9 subjects
courses 11, 17, 21A, IDS
environmental governance
integrative knowledge building
environmental history & culture
earth systems & environmental science
16 subjects
courses 1, 8, 12
10 subjects
courses 12, 17, EC

Guiding principles for ***environment & sustainability*** minor

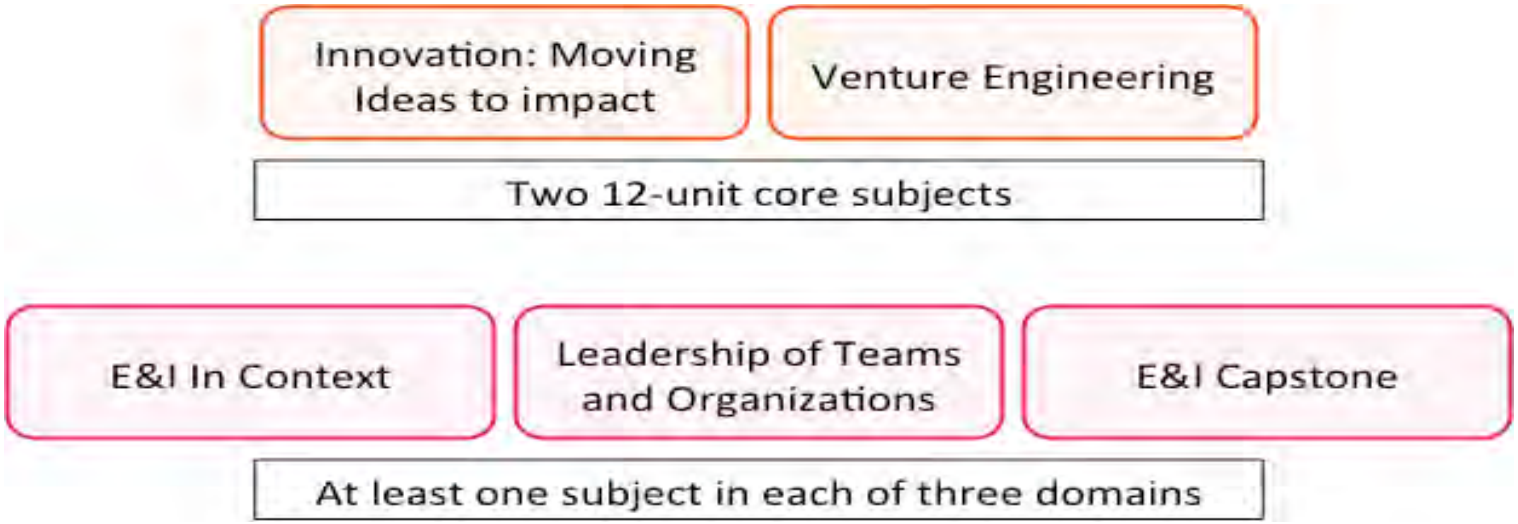
1. 5-7 subjects ***(preference for 5)***
2. No ***hidden*** pre-requisites
3. Simple, transparent, flexible curriculum model
4. Clear integrative component ***(throughout)***

Timeline


Minor review/approval process complete
5/1/2017
Submit proposal
11/15/2016
Launch minor
9/1/2017
May
Jul
Sep
Nov
2017
Mar
May
Jul
Sep
2017
Today
Community meetings (roughly monthly)
5/23/2016
10/31/2016
Proposal development
8/1/2016
10/31/2016
Committee presentations/meetings (CoC, CUP)
11/1/2016
1/31/2017
Confirm advisors, publicize minor
5/1/2017
8/31/2017

A recent example

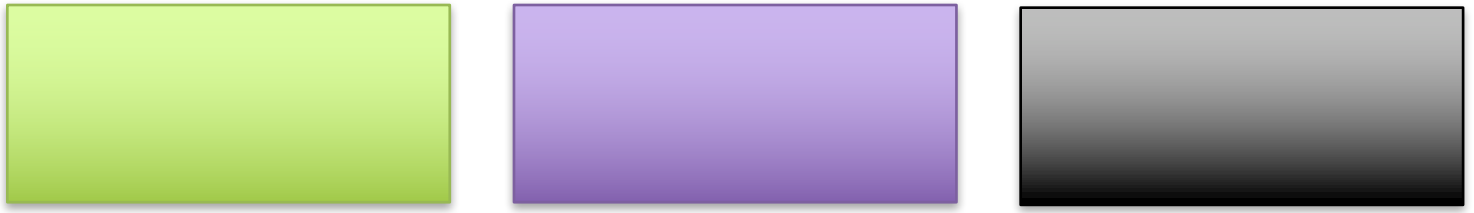
Undergraduate E&I Minor



Jointly offered by the School of Engineering and Sloan School of Management with an advisory board across all five schools as well as the Trust Center, GEL, and D-Lab.

A possible curriculum model for environment & sustainability

Two 12-unit subjects integrating four pillars



Three electives distributed across…
… the four pillars?
… discovery, invention, application?
… a different scheme?

ENVIRONMENTAL SOLUTIONS INITIATIVE