DUSP Undergraduate Strategic Plan
FINAL
June 5, 2020

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  - Sandra Elliott
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Abstract / Executive Summary

The authors of this report -- the DUSP undergraduate committee and the urban science subcommittee (henceforth we will refer to ourselves as “us” or “the committee”) -- were charged with creating a strategic plan for the growth, promotion, and maintenance of both undergraduate majors in DUSP.

DUSP has offered an interdisciplinary, pre-professional undergraduate degree since 1970. Over the past few years, there has been a resurgence in the number of undergraduates in the Department of Urban Studies and Planning. Recent growth has been based on both rapid growth in the new Course 11-6 in Urban Science and Planning with Computer Science, and a renewed growth in the number of students in Course 11 in Urban Studies and Planning.

We concluded that if DUSP continues to increase the number of undergraduate students substantially, this could lead to a number of positive and self-reinforcing shifts in DUSP, such as a more coherent and cohesive undergraduate experience for majors; more engagement between DUSP faculty and undergraduate students; and new opportunities and directions for research. All of these shifts would also sustain and strengthen DUSP’s place within the broader Institute.

The committee therefore wrote this report to develop plans towards the following goals:
1. Developing a coherent and positive UG experience for both majors;
2. Continuing to grow both majors;
3. Engaging Course 6 faculty into Course 11-6; and
4. Integrating undergraduates into DUSP’s research, teaching, and social life.

In addition to the possible inherent benefits of integrating undergraduates into DUSP better, reorganizing the undergraduate major also offers a significant opportunity to rethink how DUSP is organized around teaching and advising commitment, since DUSP will also soon undertake curriculum reforms for the Master’s in City Planning (MCP) and PhD programs.

The main recommendations of the report are as follows:

1. Promote the UG majors
   a. Raise awareness of DUSP
   b. Clarify benefits of Course 11-6 versus Course 6
   c. Develop UG ambassadors
   d. Leveraging job fairs and employers
2. Orient the curriculum towards developing the field of Urban Science
   a. Develop a curriculum which connects to course 6
b. Develop introductory courses that help familiarize UG students with the field and help promote the degree

c. Communicate a clear, consistent reasons for UG students to choose to major in Course 11-6 rather than just take classes or a minor

d. Seek to provide benefits to both Course 6 and 11-6 majors

3. Support administration of UG majors
   a. Set staffing
   b. Create more social opportunities
   c. Develop clear course sequences

4. Motivate DUSP faculty involvement
   a. Further collaborations with Course 6 faculty by sharing UG burdens, providing real world settings for projects and advanced classes, and faculty research.
   b. Ensure consistent scheduling and instruction
   c. Ensure consistent and high-quality advising
   d. Provide a more consistent advising experience

5. Expand opportunities for student engagement
   a. Connect research interests to UG
   b. TA
   c. RA
   d. UROPS, SuperUROPs

Two later sections detail future decisions for DUSP about the UG major, as well as larger issues to be aware of and respond to.
Vision & Introduction

The goal of this report is to lay out a strategic plan to increase and maintain the number of undergraduates in DUSP.

If DUSP increases the number of undergraduate students substantially, this could lead to a number of positive and self-reinforcing shifts in DUSP, such as:

- a more coherent and positive undergraduate experience for majors;
- more engagement between DUSP faculty and undergraduate students;
- new opportunities and directions for research; and
- better administration and integration with the graduate degrees.

All of these shifts would sustain and strengthen DUSP’s place within the broader Institute.

Background and context

The proportion of undergraduates in DUSP is now at its highest point in the past decade. This is based on substantial growth in the number of undergraduates (UG) in the department (see figure below). We will first discuss how DUSP arrived at its current situation.

DUSP G vs. UG numbers

Fall term of each academic year. Numbers calculated from MIT Registrar Statistics.
DUSP has offered an interdisciplinary, pre-professional UG degree since 1970 with the goals of teaching students how to:

- apply the tools of economics, policy analysis, political science, sociology, and design to critical social and environmental problems;
- promote efficient and equitable change;
- work in both the public and private sectors; and
- provide a sound foundation for students intending to do graduate work in law, public policy, development, urban design, urban studies, management, and planning itself.

While these broad goals remain the same -- and are becoming even more urgent -- the tools and contexts in which we train students to tackle problems are rapidly changing.

DUSP combined computing with these social concerns by creating a new major in Urban Science and Planning with Computer Science (Course 11-6) in partnership with the Department of Electrical Engineering and Computer Science (Course 6), with the first UG majors declaring for Course 11-6 in 2018.¹

Mit's undergraduate student interests have also been changing in response to larger shifts in the world. Computing and communications have already become fundamental technologies that

¹ Henceforth we will refer to frequently-used phrases with the following abbreviations: the authoring committee as “the committee”; undergraduates as “UG”; the previously-existing major in Urban Studies and Planning as “Course 11”; and the new major in Urban Studies and Planning with Computer Science as “Course 11-6” or “Urban Science”.

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MIT's undergraduate student interests have also been changing in response to larger shifts in the world. Computing and communications have already become fundamental technologies that
now affect nearly all social and economic activity, providing new tools and opportunities and yet disrupting many industries and aspects of society. Almost half of undergraduate students are now deciding to major in computer science: in the fall of academic year 2019-2020, 1,479 out of 3,409 (43%) declared majors among sophomores, juniors and seniors at MIT are either currently majoring in computer science or joint majors with computer science. In addition, MIT is also fundamentally re-organizing itself around the Schwarzman College of Computing (SCOC) that will intersect with every existing school and department. Students also find themselves anxious regarding their post-graduation income, which has been a cited reason for the unprecedented growth in Course 6 within the student population, as seen in several articles in *The Tech* [1, 2, 3, 4, 5, 6].

At the same time, over the past few years, computation has begun to play a larger role in DUSP. New research among the faculty and graduate students have begun to tackle traditional disciplinary problems using computational tools, and to consider how computing and data affect the formulation of problems, equity, and social policy in the real world.

Rapid growth in Course 11-6 major, along with more Course 11 majors, has already led to significant changes and additions to the department:

- Two new faculty and one new instructor hire within 11-6 areas (Lai, Sevstuk, D'Ignazio)
- Participation in the new SCOC through for new curriculum and research collaborations
- Participation in the New Engineering Education Transformation (NEET), an effort to change engineering education across the Institute

Even as computation and technology have become more important in DUSP and MIT more broadly, MIT undergraduates have also become more concerned about social and ethical concerns, as seen in class enrollments and in the development of an ethics class in Course 6 (6.904: Ethics for Engineers) and new ethics units in classes like 6.031 (Elements of Software Construction) and the Computing and Society concentration within SHASS.

**Structure of this document**

The following sections of this report build upon the current situation in order to lay out:

- immediate goals for the UG major;
- recommendations for DUSP to move towards these goals; and
- broader questions for further discussion among the DUSP and MIT faculty.

We address these immediate goals, recommendations, and broader questions at greater length below, but the table below shows how we have structured our discussions about them:

- three rows describe scales of action in the broader world, at MIT, and in DUSP;

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2 As calculated from enrollment statistics from the MIT Registrar. 
- two columns divide the issues between tactical or inward-looking steps with the future path within our control (the left column) versus larger issues that will require more thinking and time to decide in consultation with the broader DUSP faculty (the right column);
- colors designate areas where:
  - we are doing fine (green),
  - making progress or need to take action (yellow),
  - what we will need to deliberate or decide as an entire department (orange), and
  - things beyond our control but that we need to respond to (red).
- symbols like the green checkmarks (✔️) indicate steps have already been initiated within DUSP and MIT and are either ongoing or complete.

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<th>Clear goals, path in our control</th>
<th>Remaining questions: more thinking and time required</th>
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<td>Research, teach &amp; engage towards</td>
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<td>- world during &amp; after-COVID?</td>
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<td>- recovery &amp; change</td>
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<td>- mitigation and adaptation</td>
<td>- sustainability, climate change?</td>
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<td>Clear urban science contributions?</td>
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<td>Grow, promote major to UGs using:</td>
<td>Competing with the rest of MIT:</td>
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<td>- focus on tech. &amp; engineering</td>
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<td>exploratory, discovery✔️</td>
<td>- family / student concerns wrt to future income &amp;</td>
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<td>- Advise students consistently</td>
<td>- Course 11 -- stable?</td>
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<td>- Rethink class structures</td>
<td>- Course 11-6 -- ceiling?</td>
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<tr>
<td>- Engage DUSP UGs in research</td>
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</table>

We will not address things that MIT DUSP is already doing in the broader world like research, teaching, and engagement (the green-shaded areas). We are not being complacent, but these areas are out of the scope of this report. The next three sections will focus on immediate steps that we can take to improve the UG experience (yellow-shading), future or medium-term...
decisions that DUSP needs to make as a department (orange-shading), and the larger unresolvable issues in the future that we need to be aware of and respond to (red-shading).

Immediate goals for the UG major

Goal 1: Developing a coherent and positive UG experience for both majors

The DUSP UG committee felt strongly that we need to support both majors -- Course 11 and 11-6 -- while enabling a coherent and positive DUSP UG experience. It is critical to ensure that our two UG majors, 11 and 11-6, have equal opportunities for research, learning, and internships. At the same time, part of building a strong UG program means building a strong UG community so that students in both majors can interact with one another. This can also be accomplished by crafting both our internal messaging to the faculty and staff, and external messaging to the student body, that Course 11 and 11-6 are within the same program and department.

As we attract new students, we must also preserve what existing majors like about DUSP, including:

- a close, engaged community of students, and
- mentorship and advising to support UG students as they navigate the challenging environment of MIT.

In the past, DUSP has been able to do these things well due to a low student-to-faculty ratio. DUSP will now need to find new ways to enable a high-quality UG experience for students, and accommodate a growing number of students with increasingly diverse interests.

This also represents a ‘no-regrets’ strategy, since Course 11 has stabilized in recent years and Course 11-6 is very new and continues to grow. If circumstances change (see section on Future Decisions for DUSP below), then we can revisit this commitment.

Goal 2: Continuing to grow both majors

We decided that a reasonable goal for the UG program is to reach a total of about 40 students, or approximately 10 students declaring freshman year and sticking with the UG majors through the sophomore, junior, and senior years. Growing the DUSP UG majors to 40 majors would be a significant achievement, putting us at the top of all non-engineering majors. This would also be approximately equal in DUSP to the population of the PhD students and approximately 50-75% of the MCP student body. If we reach this significantly higher level, then we can later re-evaluate our progress and goals.
We developed this target by considering our goals and then comparing the size of the existing majors at MIT (see Table below). First, approximately ten students per year is the minimum size cohort around which to do curriculum planning. Second, students choose among majors at MIT and this is dominated by engineering and then science. The largest majors at MIT that are neither science or engineering are Finance (15-3), Business Analytics (15-2), and Management (15-1), all undergraduate programs at Sloan focused on business and finance. Course 11 and 11-6 currently sit at the middle of the pack of majors that are neither science or engineering. Note that the new joint major of Computer science, Economics and Data Science (6-14), which is one year older than the 11-6 major, has many more students than Economics (14-1) alone.
### Choice of majors among MIT undergraduates

**Declared First Year Majors for Fall 2020**

Registrar’s Office, April 24, 2020

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Total: 1106

**Declared majors among Upperclassmen 2019-2020, May 25, 2020**

Registrar’s Office, based on Fall Term 2019-2020

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</table>

Total: 3421

* Diff = First Year Percentage (Spring 2019) - Upper Classes Percentage (Fall 2019)

** Students in jointly-offered majors not included in non-primary department totals.
Goal 3: Engaging Course 6 faculty into Course 11-6

We need to continue creating connections between DUSP, a UG major that has seemed traditionally farther away from Computer Science, to the Computer Science field, and by encouraging relationship building with the Course 6 Department, by offering a broad range of research and educational opportunities. We believe that these new initiatives will not only drive interest, but also drive new resources, collaborations, and possibly directions for DUSP at all levels, not just in UG education.

Goal 4: Integrating undergraduates into DUSP

Providing a high-quality experience to a larger number of UG students will require us to make changes in DUSP, while at the same time coordinating these changes with the ongoing reform of our other degree programs, the MCP and the PhD. Many of our UG students may want to take graduate classes, apply to our graduate programs, and become strong voices in DUSP. In order to encourage these explorations, we will need to coordinate more closely with our graduate degree programs so that growth of the UG program becomes part of the larger DUSP mission and vision.

Proposed actions

Action 1: Promotion

In keeping with our growth goal above, we need to promote the UG major to achieve this goal. The subsections below will describe how to tap into how UG students choose their majors.

Raising awareness of DUSP

We need formalized schedules and lists in order to keep track of the many events and ways that UGs at MIT hear about and choose majors:

- Develop a robust event schedule that allows staff, faculty, and UG students to coordinate on staffing and going to these many events (see Appendix 1, this needs to be finalized)
- Develop “feeder” coursework that helps introduce UG to the 11-6 major:
  - More urban-related problem sets in the core CS classes
  - Large classes like Negotiation and Big Plans that reach many non-11 UGs early
  - IAP workshops, discovery courses, urban science focused problems sets
Clarify strengths of Course 11-6

DUSP needs to clarify some of the benefits of signing-up to a Course 11-6 major over doing a regular Course 6 major:

- Many students see an advantage to a reduced set of course 6 requirements that maintain the core CS classes, but allow them to pursue interests outside of technical CS classes such as domain-specific context, or learning about governance, social policy, equitable development, and so on.

Develop UG ambassadors

Enabling UG students to be ambassadors for both the major and careers is one of the most effective and consistent ways to promote the major and to build community. Therefore, we should enable and encourage the following activities:

- Engage upper-level students in recruiting younger students, including:
  - Organizing a student-led FPOP
  - Participating in admissions blog
  - Shaping CPW event
  - Posting current student stories and blog posts
- Continue branding efforts:
  - Provide information through course website, promotion material, logos, flyers, and posters.
  - Work with DUSP communication team to post regularly urban science-related Twitter feeds and students' work.
  - UG students will communicate best with other UG students, so we need to give them a strong voice and role in promoting the UG major.

Leverage job fairs and employment

One of the chief considerations for many UG majors is their future job prospects. The career path after graduation from Courses 11 and 11.6 is exciting and flexible, but we need to connect students with opportunities. In addition to existing urban planning jobs that Course 11 students and faculty are already aware of, there is considerable confusion among students (and even among faculty) about where the future job prospects will exist for the Course 11-6 graduates. Both for students and ourselves, we need to clarify the kinds of jobs we are training all of UG students for.

Since many industry partners are interested in R&D collaboration, and they will usually reach out to specific faculty first, we need to coordinate better communication of contacts and opportunities with MJ and the career office. Steps include:

- Check in with faculty if their research may lead to prospective R&D opportunities for UG
- Coordinate with career development:
  - Develop a list of contacts for career development and host a career fair at DUSP.
○ Maintain e-mail contact list can be also used for inviting guest speakers, collaboration partners, project sponsors, internship and hiring opportunities.

Finally, we discussed whether it would be better to have a UG-focused DUSP Career Fair in the Fall, or else ensure that companies that are specifically looking for Course 11 and 11-6 graduates come to the main campus career fair.

- Aim at data and technology companies that are interested in cities and information (e.g. New Urban Mechanics) so that the focus is mainly on technology and planning-related jobs, i.e. 11-6. Timing should be end of fall or early spring.
- Work with Course 6 to help recruit companies that are interested in 11-6 to network with our students (the right parts of Google, etc).
- Invite agencies and organizations who do not normally come to MIT, such as data journalists, state and local governments, and other groups.
- Tap into network of recent graduates

Action 2: Orient courses towards developing the field of Urban Science

Curriculum that Introduces UGs to the field of Urban Science

Better coordination of class schedules

Appendix 2 details the many constraints that govern UG schedules. Consistent scheduling of classes that do not conflict with other requirements will make it easier for students to pursue both majors.

"Feeder" courses that expose UG students to Course 11 and 11-6

New and existing undergraduate courses can be used to expose students to both majors. For example:

- Encourage the development of courses that meet HASS requirements to draw in more students who might not know about the field.
  - Use these to add critical context for our students for our discipline.
  - Identify one or two most popular DUSP HASS subjects for a larger group of first-year or sophomore students.
- Offer first-year discovery classes (FYD):
  - Andres developed a course for Fall 2020 as an add-on to 6.002 where students will work on problem sets in urban science domains.
  - Justin and Mariana taught a course in Spring 2020 on Climate Justice and Cities
  - Catherine taught a course in Spring 2020 on Urban Science for Public Good. The latter suffered from low enrollment due to scheduling, but she plans to redesign it as a "Discover Urban Science" class consisting primarily of guest lectures and
local field trips, schedule it at a convenient time for first-years, and promote it through coordinated efforts with first-year groups.

○ Yuan developed a class in Data Science and Urban Planning. The class directly connects to 6.0002 so students use computing skills to work on urban data, emphasizing on two main learning points: urban data landscape (source, typology, opportunity, limitation) and applied computing (with real-world data). Students know that data needs to be cleaned and integrated from various sources. This is offered in a mini-version (3 units) during IAP in a bootcamp/hackathon style, and a more elaborated class (6 units) in Spring and this Fall.

○ Consider offering new discovery courses with current themes such as COVID-19.

● Offer first-year DUSP advising seminars:
  ○ Ezra has taught these in years past, and expanding these offerings could be as or more effective than the first-year discovery courses.

● Integrate lecture series classes into the curriculum:
  ○ Andres' Spring 2020 lecture series course could be converted into a regular yearly offering rotated amongst urban science faculty.
  ○ Promotes consideration of urban science topics amongst graduate students;
  ○ Can be integrated into the NEET curriculum, so that NEET students attend 2-3 lectures. This becomes an additional path of exposure to Course 11 and 11-6 topics at the undergraduate level.

● Use some popular project-based subjects (e.g., 11.007, 11.154) as a promotion tool for the major, by trying to figure out ways to connect to UG students.

Pedagogy aligned with mission & intentions

Existing UG courses that are consistently highly ranked and have robust enrollment numbers have certain particular features. STEM students respond very positively to educational experiences that:

● Teach them to develop specific skills,
● Challenge them to confront their blind spots, and
● Empower them to build character.

One informative example is in Bruno’s classes, both 11.011 The Art and Science of Negotiation & 11.111 Leadership in Negotiation: Advanced Applications. These electives have pre-registration numbers well above other excellent semester-long negotiation courses taught across campus that teach similar skills. Bruno attributes this to approaching negotiation skills behaviorally, thematically, and pedagogically with the clear emphasis in ethics and spirituality at the heart of 11.011 and 11.111.
Develop urban science curriculum further

Keep Building Urban Science Curriculum Structure

A. Exploratory / Discovery Activities

The intent of the exploratory & discovery classes and activities is to introduce Undergraduate students to Urban Science and draw them into the major. These classes should focus on connecting to themes that are popular in the urban science field to help draw students into the major. An effort should be made to connect with computer science faculty in the development of these discovery courses to help ensure the coherence of 11-6 and to facilitate connections via urban-linked exercises in the introductory computer science classes.

i. IAP events and mini-classes
ii. 6.0002 / Discovery connections - Tie Urban Science Themes to class exercises
iii. First Year Discovery Subjects:

- AI and Urban Planning (First-year discovery subject)
- New discovery courses with current themes such as COVID-19.

iv. NEET Independent Study (3 credits - go to three lectures and write paper)
v. Urban Science themes for departmental Lecture / Talk Series

B. Required Courses

The required ‘core’ classes provide students with the fundamentals of both urban planning and computer science in order to build core skills in urban science. Then there are several classes that meld these two fundamental skills together. It is important to express the skills we believe are the core of urban science to help students know what they will gain from the major. It will also help them illustrate how they are different from a typical urban planner or computer science major as they bring together both skill sets to apply them to a variety of problems.

i. Urban Planning / Computer Science Base Level Skills

- 11.001[J] Intro to Urban Design and Development
- 6.0001 Intro to Computer Science and Programming in Python
- 6.0002 Intro to Computational Thinking and Data Science
- 6.042[J] Mathematics for Computer Science
- 6.006 Intro to Algorithm
- 6.009 Fundamentals of Programming
- 6.031 Elements of Software Construction
- One policy subject from 6.805, 11.002, 11.011, or 11.165

ii. Urban Science Focused Skill Classes (really combining 11-6)

- 11.007 Urban & Environmental Technology Implementation Lab
- 11.188 Urban Planning and Social Science Laboratory (CI-M)
C. Electives and Advanced Coursework

Electives connect students to the vast field of urban science applications allowing them an opportunity to combine their foundational skills and develop new ones. Students will connect more the work they learn in computer science to urban planning applications. These courses will ideally give the students agency through strengthening the developed skills and allowing them to connect their disciplines to applications they care about within urban systems. Along with this, DUSP should encourage the development of courses that meet HASS requirements so we can draw in more students who might not know about the field. These HASS electives will continue to add critical context for our students for their discipline.

DUSP should also encourage the development of collaborative courses with Course 6 instructors, perhaps co-teaching a class. **Funding support should be provided for the development of these courses, from the promotion package.** Efforts should be made to support project-based courses. Many course 6 subjects are lectures with big class sizes. DUSP can provide students with opportunities to apply computing skills and build their own projects. **Funding support from the Urban Science Promotion fund should be used to help encourage these courses.** Electives include following types:

i. Technical Skills Building (e.g., data visualization, spatial analysis)

ii. Project/Client Based Electives: to fulfill the need for practical experience because urban sciences is an applied field and many students will become practitioners. Such as Crowd Sourced City.

iii. Deep Subject Matter: Currently we have few courses which explore urban science subject matter more deeply (e.g. deep learning in transportation). Developing these elective classes along with course 6 faculty should be encouraged and supported through the DUSP promotion funds.

iv. Critical context through social sciences: These would be HASS electives that would place Urban Science in the context of the humanities, arts, and social sciences. These courses would serve as a gateway into the discipline for all undergrads and give Urban Science students the ability to reflect on the context of their discipline and develop specific critical analysis and communication skills.

Continue to engage Course 6 faculty

One of the main barriers to entering 11-6 is that many students have the impression they can not tell employers they are computer scientists. We can change this impression if we show them urban-context applications of CS early in introductory classes, and emphasize that they can
take the same core classes as 6-3 majors but with a deeper understanding of how to apply CS to real world problems. Then students can feel comfortable telling employers that they have the same technical basis as CS majors and a better understanding of how to use it in urban applications.

We recommend that Urban Science promotion funds should be used to help deepen our connection with Course 6 through the development of joint classes and the funding to help make that development happen. This type of collaboration started by including an Urban Science-based exercise into 6.0002, but only one exercise has been introduced so far, and we need to do more. Other courses where this might be useful as well include:

- 6.006 (Algorithms)
- 6.041 or 6.008 (probability and inference)
- 6.034 (AI)
- 6.036 (ML) or
- 6.031 (++)

Urban Science Focused Skill Classes should consider teaming up with Course 6 Faculty when possible to help bring the two sides of Urban Science closer together.

<table>
<thead>
<tr>
<th>Urban Planning</th>
<th>Computer Science</th>
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<tbody>
<tr>
<td>Theory in urban planning and design</td>
<td>Programming</td>
</tr>
<tr>
<td>GIS and data visualization</td>
<td>Algorithms</td>
</tr>
<tr>
<td>Policy and ethics</td>
<td>Software Engineering</td>
</tr>
<tr>
<td>Urban technology implementation</td>
<td>Inference and Machine Learning</td>
</tr>
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</table>

**NEET and Digital Cities Thread**

New Engineering Education Transformation (NEET) is a cross-departmental endeavor led by MIT School of Engineering with a focus on integrative, project-centric undergraduate learning. NEET offers five different topics as “threads” so students can immerse themselves in projects that cross disciplinary boundaries while earning a degree in their chosen major.

Digital Cities (DC) Thread prepares students to build technology that serves the public good and to design and implement public interest technology or civic technology specialized for the urban environment. In February 2020, DUSP and NEET leadership team had a meeting to lay out future strategies for DC. Both parties agreed to revise the DC requirement with a lighter load and more flexibility to accommodate different students’ schedules and interests (Table X). We believe such revisions create better distinctions between Course 11-6 as a major and NEET as a certificate program.

Table X. NEET Digital Cities Thread Requirement (2020 Fall)
<table>
<thead>
<tr>
<th>Type (units)</th>
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<th>Instructor</th>
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<td>6.0001/0002 Intro to Programming</td>
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<td>Project (12)</td>
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<td>11.154 Big Data, Visualization, and Society</td>
<td>Williams, S.</td>
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*NEET Independent Study requires students to attend 3 urban science speaker events (lectures or talks) and write a report for the instructor to grade.

NEET DC started in Fall 2019 and has gained 16 undergraduate students by May 2020. Half of the students (8) are from major course 6-3 (Computer Science and Engineering) in EECS, four students are in 11-6, and the rest from Physics, Math, and Mechanical Engineering. We expect to see future growth of DC with two clusters from 6-3 and 11-6.

We believe our engagement with the School of Engineering through NEET DC Thread brings unique value for course 11-6 development and promotion, including:

- Better understanding undergraduate STEM education through NEET;
- Engagement with a larger group of undergrads through other NEET Threads;
- Increased presence of urban science in undergrad community;
- Attraction to more students from EECS who are curious about cities yet not committed to majoring 11-6.

Meanwhile, we need to ensure distinctions between 11-6 and NEET to avoid students' confusion. In order to make sure that Course 11-6 and NEET complementing one another and do not compete, we need to emphasize that:

- 11-6 is a degree program by DUSP and EECS. NEET DC is a certificate granted by the School of Engineering.
- 11-6 students have a natural advantage if they join NEET DC since no additional classes are required. They only need to take DC subjects as their Course 11-6 electives.
- NEET DC students (not already in DUSP) are welcome potentially to switch to Course 11-6.
Communicate a clear, consistent value proposition to UG students

We should emphasize that urban planning and science has many themes and ideas appealing to young people. As a discipline, we are:

- Focused on solving urgent and challenging contemporary problems that have a broad impact on people, through work in the interrelated fields of environment, climate change, health, housing, transportation, land use, economic development, governance, and more, both in the United States and internationally;
- Shaped by reflection on the meaning of justice and its application to the lives of people in cities, including dimensions of process, such as democracy and public participation in decision-making, and of outcomes, such as measures of physical, social, economic, and emotional well-being;
- Advanced by interdisciplinary approaches, drawing from architecture, civil and environmental engineering, computer science, economics, history, law, philosophy, political science, public health, anthropology, and other fields; and is advanced by multiple methods, including quantitative analysis of large datasets and qualitative analysis of interviews and ethnographic study.

Seek to provide benefits to both Course 6 and 11-6 majors

There are substantial benefits to offering classes such as 11.001 and 11.THT (thesis prep), where students can learn side by side can be a way that students interact and learn to be in the DUSP UG community.

If UG numbers grow sufficiently, then we may consider a thesis prep course to relieve some of the burden of advising by having a cohort of students who can be advised by a faculty regularly.

Other areas where the two majors may intersect are:

- Technical Skills Building, like in data visualization or spatial analysis.
- Project/Client Based Electives, fulfill the need for practical experience.
- Deep Subject Matter, such as deep learning in transportation
- Currently we have few courses which explore urban science subject matter more deeply.
Action 3: Support administration of UG majors

Set staffing

We have already designated a dedicated staff person (Sandra Elliott) for both undergraduate programs and the main point of contact for UG students, which should improve coordination of the UG program.

We have two technical instructor positions in urban science, one to support undergraduate population and one focused on supporting the graduate population. It is essential that we clarify the roles these technical instructors play in teaching and promotion of the Urban Science Degree.

Create more social opportunities

- Create a dedicated social and study space for UG with simple amenities similar to the MCP student lounge and PhD offices: an inexpensive coffee machine, tables, white boards, a couch appropriate for napping. The MIT Energy Initiative coordinator tells us (Hsu) that a key factor in attracting students to the energy studies minor is simply providing food regularly in the Energy Commons, their designated space.
- Enable students to create shared experiences, including retreats, representation on DSC, informal fun activities, and activities around graduation for our seniors, for example, where students present thesis work. The key, however, is to let the students do what they want, since they will be more engaged and motivated if they can do things that will appeal to other students, instead of a staff or faculty-driven process which is likely to flag over time.
- Serving our current students well and developing a strong sense of community can take place through many events, including but not limited to:
  - a UG work showcase
  - Fall, spring events for new majors and for returning students
  - Faculty and staff dinners with students
  - Career development events
Fall Thesis poster event (11.THT) and spring thesis presentations

Develop clear course sequences

Helping students map out the courses they need to take is important for students successfully completing the major.

- Most students find their courses through CourseRoad. We should investigate how Course 11 and Course 11-6 are presented in this format.
- Appendix 3 below shows a narrative and sample course map for Course 11-6.

Action 4: Ensure faculty involvement is consistent

Engaging Course 6 faculty into Course 11-6

Right now John Guttag has been the most consistently involved faculty member from Course 6, but we need to find other ways to make sure that CS faculty members remain involved in the major.

Ensure consistent scheduling and instruction

One of the principal obstacles to offering consistent teaching schedules that students, staff, and faculty tend to identify is that some faculty do not commit to teach classes consistently.

- Classes that DUSP requires for graduation for all degree programs, along with large electives fulfilling HASS and CI-H requirements, should be given priority (and if necessary, enforcement and incentives) above optional classes that have yet to see significant student demand.
- Not all faculty teach the same class load. Addressing this problem thoughtfully and collaboratively could easily fix some of the problems that we have with consistent staffing and instruction schedules.

While the DUSP Norms memo makes clear to new faculty the teaching requirements, it does not necessarily enforce or incentivize consistent teaching, advising, and scheduling among all faculty. Possible enforcement and incentive structures are:

- Faculty teaching core or required classes should have priority to teach less than faculty who choose to teach electives or classes that are not immediately required.
- Faculty should be required to sign up for multiple or repeated teachings of any new classes that they propose.

Ensure consistent and high-quality advising

We have determined that we want the UG program to maintain the "high-touch" approach that we currently have with graduate students, which means the following:
- Staff and faculty are available to meet with their academic advisees during critical decision points (e.g. registration) as well as on an as-needed basis when students want to discuss issues critical to their educational progress.
- Faculty supervise UG theses and guide progress towards a successful final product.

Provide a more consistent advising experience

As a department, we need to incentivize faculty participation in UG programs, particularly as our numbers increase. Faculty must be rewarded for advising UG theses and teaching UG coursework equally as MCP theses. Therefore, we could develop:

- First year advising seminars
- Revise the DUSP Norms Memo to include UG advising on equal par with graduate advising
- Department Head makes a presentation at faculty meeting regarding advising expectations.

Advising work may quickly become inequitably distributed. People who are poor advisors consequently do not get requests to advise, and those who invest a lot of time and emotional labor may become overburdened with requests. Also, in order to avoid unequal gender distribution of advising work -- with students often seeking women faculty and sharing emotional and life challenges during advising sessions -- we propose the following remedies:

- Track gender and thesis advising / academic advising at grad and undergrad levels
- Department Head reviews data and checks in with all faculty annually
- Undergrad committee reviews advising data every semester and discusses how to balance
- Use the DUSP Norms Memo to establish upper limits on how many students a faculty may advise

Finally, UGs are shy about getting thesis advisors, and various means of overcoming this include:

- CDD MCP students could court faculty, and faculty commit, through an online tool;
- Short talks in Cherie’s thesis prep class in mid-semester in Fall to address how UGs go about getting an advisor
- An UG lottery system: if this works in UG, it may be easier to sell to MCPs. The goal is for everyone to be matched by first-second week of November. This can also be aligned with Caesar & MCP curriculum revamp to extend to MCP advising by Fall 2022

In order to overcome the challenge that MIT rules and requirements for UG are complicated and continue to change, we need to designate a single staff person to keep up with these rules and regulations, in order to educate faculty about how to navigate this system.
Finally, mental health issues continue to place a large burden on faculty trying to advise students. We need to educate faculty how to work with S3 to provide good advising to students and get them to the services that they need.

**Action 5: Expand opportunities for student engagement**

**Connect research interests to UG**

We need to increase faculty participation in fall, IAP, spring, and summer UROPS and use of UROPS to foster the DUSP UG community. This can be done through better information to faculty about deadlines as well as funding sources and opportunities. Additionally, we should encourage faculty to promote their UROPs to the DUSP undergraduate channels (email list, other channels?) and to consider giving priority to UG majors when they are hiring.

UGs at MIT have many skills that could be very useful in working on funded faculty research projects. However, in order to get UGs engaged in research may require additional experience and training for faculty, postdocs, and graduate students to meet them at their current level of education in terms of existing research skills. The UROP program is well-established on campus among the UG population and provides the existing infrastructure for matching between UG student and faculty interests.

As the number of UG students in DUSP expands, the goal of our TA, RA, and UROP opportunities should be to steadily increase collaboration and engagement of UGs within the wider DUSP community. Faculty and staff can do this by helping UGs get involved in TA, RA, UROP, and SuperUROP opportunities:

**Make TAs more available**

- Use UG and MCPs (preferably fifth-year former undergraduates) as TAs and RAs where possible.
- With an increasing number of UGs and a steady roster of classes, we should be able to offer UGs a steady stream of TA opportunities every year. We need to make clear what classes will have TAs in advance -- preferably as the classes are assigned -- so faculty and current TAs can identify current students as promising future TAs.
- Offer a more extensive TA training / community building workshop. This might help for other TAs who are MCPs and PhD students also.

**Make RAs more available**

- Give RAs to students to let them to lead promotional activities.
- Publicize research talks to the UG students so they can get a better idea of how to engage in research activities.
- See UROP and SuperUROP programs below.
Make UROP / SuperUROPs more available

- UROPs are a very good existing model for students to get involved in research, since it is well-publicized among both students and faculty plus there seems to be ample Institute and departmental funding for this.
  - Publicize to faculty on a regular basis when the UROP deadlines are: generally the first few weeks of fall, IAP, and spring. Schedule [here](#).
- SuperUROP -- Existing SuperUROP within course 6 is one possible precedent or collaboration to combine aspects of our current RA and UROP structures:
  - SuperUROP is a program within Course 6 that integrates with a research class 6.UAR and sees students taking a one year research project. This program is actually sponsored by companies which students also network with.
  - This type of program allows more in depth research than traditional UROP and an opt in policy from faculty and labs. It can also be great for graduate students to be involved with mentoring these types of UGs.
  - 6.UAR is already an option for 11-6 degree requirements, so if anything we can just integrate with the existing SuperUROP program in Course 6 by adding our faculty to the list (similar to how biology has done and other faculty who are not in Course 6).
- Make the 6.UAR model work for all of DUSP:
  - We may also want to create our own 11.UAR as an equivalent for all of our UG students, so 11 and 11-6 majors can take it without necessarily having to enroll in 6.UAR projects which may not align with their interests.
  - Raise an SA+P level discussion of something like an “urban” SuperUROP to bring similar advantages to course 11 majors.
- Allocate funding so our students can participate in the program in our department
- Develop a departmental schedule of seminars, presentations of work conducted in the course of research to share research experiences.

Future decisions for DUSP about the UG major

Coordinate UG with future changes in MCP and PhD

As a department, DUSP may not need to decide anything or make any larger, structural changes with regards to the UG majors and graduate programs today, but this section considers the consequences if any of the following situations occur in the future:

1. Course 11 declines;
2. Course 11-6 stalls and declines;
3. Course 11-6 becomes much larger than Course 11; and
4. Total UG enrollment increases and graduate enrollment declines.

DUSP would then be confronted with a number of decisions to make with regards to the UG major with respect to the graduate programs and the focus of the department.

In situation 1 -- in which Course 11 declines -- leads to the question of how much DUSP should continue to support Course 11. When DUSP last examined the Course 11 UG major in 2015 -- and before the existence of the Course 11-6 major -- the UG committee identified the following problems, which generally fell into two categories:\(^3\)

- **Poor student experiences:**
  - “As the overall number of majors has declined, the proportion of students who come to Course 11 after encountering difficulty at MIT seems to have grown.”
  - “DUSP undergraduate majors report that they do not feel part of the department as a whole or even their own cohort of fellow majors, and are unaware of the many departmental and school resources that are available to them.”

- **Lack of administrative or faculty support:**
  - “DUSP has no consistent recruiting strategy to attract students to our courses and to the major and minor”
  - “Membership and leadership of the undergraduate committee changes frequently (with the exception of Cherie Abbanat, whose presence has been consistent) with little continuity”
  - “Many of the required courses for the major have been taught by doctoral students rather than by DUSP faculty.”

The UG committee decided at the time that the UG major should get no additional resources, but that recruiting efforts should be increased. The UG committee essentially recommended a holding pattern: “in essence, we recommend that DUSP put the undergraduate major on notice.”

In short, if Course 11 numbers continue to dip, DUSP would again have to revisit whether it wants to have a traditional Course 11 UG major at all.

In Situation 2 -- where the new Course 11-6 major in urban science stalls and declines -- then DUSP would have to decide at what level it wants to support either UG major. Much of the original budget request for urban science was earmarked specifically to promote and grow Course 11-6. If DUSP is unable to grow the Course 11-6 major, similar to the decision above with Course 11, DUSP would have to decide whether the major can be grown or if it wants either UG major at all.

In Situation 3 -- where the new Course 11-6 major in urban science grows to be larger than the existing Course 11 major -- DUSP would be challenged to maintain the goal stated above of maintaining the same UG experience for both Course 11 and Course 11-6. Course 11 students would both be outnumbered by the Course 11-6 students, and faculty interest and existing

\(^3\) DUSP UG Committee report draft of 4/6/15, chaired by Anne Whiston Spirn, copy available here.++
resources may not be allocated equally. DUSP would then again need to revisit the engagement of faculty in the Course 11 major, or else further expand resources and support of the larger Course 11-6 major.

In Situation 4, UG enrollment continues increases faster than the graduate programs, and becomes a significant fraction of the students in DUSP (perhaps one-third, or double the current percentage). While this situation does not at the moment seem likely, this is also possible given what is happening in the larger economy and job markets. If this situation were to occur, then graduate classes would be undersubscribed and UG classes would be oversubscribed. DUSP would then have to decide how to reallocate faculty time and teaching from the graduate programs to the UG degrees.
Larger issues to be aware of and respond to

We should recognize, however, that the current situation may change many of these recommendations with regards to the UG majors. DUSP cannot necessarily or singlehandedly affect changes at the Institute level as a result of:

- COVID,
- a recession and perhaps depression,
- budget cutting in local and state governments, and
- long-term issues like sustainability and climate change.

DUSP should be aware of, and respond to,
## Appendix 1: UG Promotion Strategies

### PROMOTION 2020

<table>
<thead>
<tr>
<th>Month</th>
<th>Program</th>
<th>Target</th>
<th>Important Dates</th>
<th>DUSP Contact</th>
<th>MIT Contact</th>
<th>URL</th>
</tr>
</thead>
<tbody>
<tr>
<td>JAN</td>
<td>IAP subjects aimed at UGs</td>
<td>MIT all</td>
<td>?</td>
<td>Yuan</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Major Exploration Event (during IAP - find out when we need to sign up for it)</td>
<td></td>
<td></td>
<td>Ezra? Yuan?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FEB</td>
<td><strong>Reg Day</strong></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>UROPs, Super UROPs</td>
<td></td>
<td></td>
<td>Justin will coordinate</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>11/11-6 Discovery Subject</td>
<td>MIT all</td>
<td>Fall subjects due mid-March</td>
<td>Catherine, Justin, and Mariana for Spring 2020, Andres for Fall 2020. (need to get catalog numbers and commitment to permanent courses)</td>
<td>Office of the First Year</td>
<td></td>
</tr>
<tr>
<td></td>
<td>X-Fair</td>
<td></td>
<td></td>
<td>Tech-X</td>
<td></td>
<td>Link</td>
</tr>
<tr>
<td>MAR</td>
<td>NEET First-year Discovery Class</td>
<td>MIT first-year</td>
<td>Mar. 9th for Digital Cities</td>
<td>Yuan Lai, Eric Huntley</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Digital Cities Dinner</td>
<td>NEET and 11-6 students &amp; friends</td>
<td>Mid March</td>
<td>Yuan Lai is currently scheduling</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Spring Break**
<table>
<thead>
<tr>
<th>Month</th>
<th>Event Description</th>
<th>Department</th>
<th>Student</th>
<th>Contact Persons</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>APR</td>
<td>Major exploration event?</td>
<td>MIT all</td>
<td>Yuan - Ask Ezra about timing and where to sign up</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Campus Preview Weekend (CPW) (department event, student event, UROP tour)</td>
<td>Admitted students</td>
<td>Due by Mar 1st. Apr. 16-19</td>
<td>Yuan Lai Justin Steil</td>
<td><a href="#">Link</a></td>
</tr>
<tr>
<td></td>
<td>Welcome event for new majors</td>
<td></td>
<td>Justin, Sandra, Cherie</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MAY</td>
<td>Summer UROPs</td>
<td></td>
<td>Justin organizing - hosted by DUSP faculty</td>
<td></td>
<td></td>
</tr>
<tr>
<td>JUN</td>
<td>MISTI Program (Internships Abroad)</td>
<td></td>
<td>Student initiative</td>
<td></td>
<td><a href="#">Link</a></td>
</tr>
<tr>
<td></td>
<td>DUSP-PKG Service Fellowships</td>
<td>Application due by Apr. 13</td>
<td>Student initiative</td>
<td></td>
<td><a href="#">Link</a></td>
</tr>
<tr>
<td>JUL</td>
<td>MITES</td>
<td>High schoolers</td>
<td>Six-week in summer</td>
<td>Yuan and Justin will meet with OEOP to see if this is possible for 2020.</td>
<td><a href="#">Link</a></td>
</tr>
<tr>
<td>AUG</td>
<td>MOSTEC</td>
<td>High schoolers</td>
<td>Six-month online learning and one week in MIT</td>
<td>Yuan and Justin will raise with UG/11.6 Committees.</td>
<td><a href="#">Link</a></td>
</tr>
<tr>
<td></td>
<td>DUSP FPOP</td>
<td>First year students</td>
<td>Start organizing in Feb./Mar.</td>
<td>Justin, Ezra, Ellen, Yuan</td>
<td></td>
</tr>
<tr>
<td>SEP</td>
<td>Academic Expo</td>
<td>MIT all</td>
<td>Yuan</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Reg Day</td>
<td>UROPS</td>
<td>?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11/11-6 Discovery Subjects</td>
<td>MIT all</td>
<td>Spring subjects due in September</td>
<td>Andres S. for 2020 Fall (we should include these in discussion of consistent/varied classes for UGs, catalog number not special subject)</td>
<td>Office of First Year</td>
<td></td>
</tr>
<tr>
<td>First year advising seminars</td>
<td>?</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Hack MIT</td>
<td>MIT all</td>
<td>Early September</td>
<td>Yuan</td>
<td>Link</td>
<td></td>
</tr>
<tr>
<td>Organize DUSP Career Fair (September?)</td>
<td></td>
<td></td>
<td>Yuan, Eran, Mary Jane</td>
<td>Link</td>
<td></td>
</tr>
<tr>
<td>OCT</td>
<td>Parents Weekend</td>
<td></td>
<td>Ezra, Ellen, Justin</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NOV</td>
<td>Major Exploration Event (late Nov early Dec)</td>
<td>First year</td>
<td>Ezra, Ellen, Justin</td>
<td>Link</td>
<td></td>
</tr>
<tr>
<td>DEC</td>
<td>Create and promote IAP activities/courses</td>
<td>MIT all</td>
<td>Ezra, Ellen</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Other Regular Promotion (To be finalized)

<table>
<thead>
<tr>
<th>Project</th>
<th>Frequency</th>
<th>Form</th>
<th>Impact Potential</th>
<th>People</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social Media</td>
<td>Bi-weekly, plus relevant events and subjects</td>
<td>Social media feeds</td>
<td>Expand the breadth of marketing</td>
<td>Takeo Kuwabara</td>
</tr>
<tr>
<td>Project</td>
<td>Description</td>
<td>Impact Potential</td>
<td>People</td>
<td></td>
</tr>
<tr>
<td>---------</td>
<td>-------------</td>
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<td></td>
</tr>
<tr>
<td>Students’ engagement at CPW</td>
<td>Student representatives</td>
<td>Students trust their peers more than us.</td>
<td>Yuan, Justin, Student reps</td>
<td></td>
</tr>
<tr>
<td>FPOP / ACE FPOP</td>
<td>Student-led tours</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Undergrad Work Showcase</td>
<td>Show students coursework, UROPs, hosting lightning talks, or write their stories.</td>
<td>Increase visibility of students and their work</td>
<td>Cherie</td>
<td></td>
</tr>
<tr>
<td>Current 11-6 Students’ Stories Blog Post</td>
<td>Each month or every two months</td>
<td>This is both engagement and promotion!</td>
<td>Takeo Kuwabara (TBD)</td>
<td></td>
</tr>
<tr>
<td>Dinner parties with current students</td>
<td>Host dinner (on campus) and chat with students</td>
<td>Gain better understanding of current students</td>
<td>Rotating?</td>
<td></td>
</tr>
<tr>
<td>Career Development (one event per semester)</td>
<td>Newsletter and career talks. Career fair @DUSP</td>
<td>Students get a chance to see what they will DO after graduation.</td>
<td>Mary Jane Daly, Yuan, Eran</td>
<td></td>
</tr>
<tr>
<td>Website Maintenance</td>
<td>Promotion</td>
<td>Common landing page for anyone interested</td>
<td>Yuan</td>
<td></td>
</tr>
<tr>
<td>Fall welcome event (bowling and pizza)</td>
<td></td>
<td></td>
<td>Ezra, Sandra, Cherie</td>
<td></td>
</tr>
<tr>
<td>Fall orientation event for new majors and returning students?</td>
<td></td>
<td></td>
<td>Ellen, Ezra</td>
<td></td>
</tr>
<tr>
<td>Project</td>
<td>Time Sensitivity</td>
<td>Impact Potential</td>
<td>DUSP Contact</td>
<td>Date</td>
</tr>
<tr>
<td>---------</td>
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</tr>
<tr>
<td><em>Media &amp; Materials</em> - update a new collection of images on 11-6 coursework and projects.</td>
<td>ASAP -</td>
<td>HIGH: We need these content in early March for multiple promotion events (CPW, NEET)</td>
<td>Yuan (will reach out urban science faculties for their subject highlight)</td>
<td>Mar. 6th</td>
</tr>
<tr>
<td>Brainstorm with students</td>
<td>Hire a RA, or organize a focus group (with tech cash reward) of current undergrad students</td>
<td>We need to hear from students on what is missing in their experience, and what engagement that they are interested</td>
<td>Yuan</td>
<td></td>
</tr>
<tr>
<td><em>Problem Set Development</em> - Identify and development new p-set for 6.0002</td>
<td>High - Yuan and Joe have identified a new problem (MCS). Plan to have more discussion with John Guttag this Spring.</td>
<td>HIGH; P-sets are useful for attracting existing Course 6 students.</td>
<td>Joe, Yuan,</td>
<td>Expect by Sep. 2020</td>
</tr>
<tr>
<td>Graduate Student 11-6 Mentors</td>
<td>Low - This should be discussed and decided in the committee meeting.</td>
<td>UNKNOWN; Do we think this as a feasible approach? May have to wait until MCP students feel less overwhelmed, perhaps IAP 2021.</td>
<td>TBD</td>
<td></td>
</tr>
</tbody>
</table>
Known UG Promotion Pipeline
This pipeline, spanning from high school into professional life, represents our initial survey of opportunities that we should consider when planning promotion of 11-6:

1. HIGH SCHOOL
   a. MIT Office of Admissions: https://mitadmissions.org/
      i. Admissions Blog: https://mitadmissions.org/blogs/
      ii. Sessions on the Road: https://mitadmissions.org/visit/mit-visits-you/fall-travel/
      iii. Visit MIT (Course 11 Tour): https://mitadmissions.org/visit/visit-mit...
   b. MIT Open Learning: https://openlearning.mit.edu/mitx-grant-program
      i. MIT+K12 Videos: https://www.k12videos.mit.edu/videos
      ii. MIT OCW Highlights for High School: https://ocw.mit.edu/high-school/
   c. MIT Campus Preview Weekend (CPW): https://admitted.mit.edu/

2. UG
   a. First Year
      i. FALL
         1. UG Advising and Academic Programs: http://uaap.mit.edu/
         3. Pre-Orientation (FPOPs): http://uaap.mit.edu/first-year-mit/orientation...
         5. Info Sessions, Dorm Groups, Fliers, Word of Mouth …
         6. REG DAY!
      ii. IAP
         1. Exciting 11-6 Workshop / Travel / Hackathon?
      iii. SPRING
         1. Major Exploration (late January early February)
         http://uaap.mit.edu/first-year-mit/first-year-academics/major-exploration/major-exploration-events
         2. REG DAY!
         3. Spring Break Special Opportunity (Late March, last chance to convince people to switch!)
         4. !Declaring Your Major! (April 26):
            http://uaap.mit.edu/first-year-mit/first...
         5. Assigned 11-6 Advisor
   b. Other Years
      i. UG Opportunities Program (UROP) - semester:
         http://uaap.mit.edu/research-exploration/urop
      ii. Independent Activities Period (IAP) January: http://web.mit.edu/iap/
         1. Competitions (DUSP IAP Competition TBA)
            b. Battle Code: https://www.battlecode.org/
            c. 2.007 Robot “Coop-etition”: http://me-2007.mit.edu/
         2. Co-Curricular Workshops
         3. Externships w/ Partners: https://alum.mit.edu/communities...
      iii. Spring Break(s)
1. Co-Curricular Competitions & Workshops
   iv. Summer(s)
      1. UROPs or Internships w/ Partners
      2. MISTI Program (Internships Abroad)
      3. PKG Service Fellowships
3. GRADUATE SCHOOL, INDUSTRY, AND/OR PUBLIC SECTOR
   a. Career Fair (Twice per Year): [https://career-fair.mit.edu/](https://career-fair.mit.edu/)
   b. Professional Development (Mary Jane Daly): **Online Resource TBA**?
   c. 5-year MIT MCP or beyond
Appendix 2: Scheduling for UG classes

Scheduling is a key obstacle for many UG, especially first and second year students who have many required GIRs. In general:

- Try to schedule after 10am
- Obviously there may be times that work outside of this, but these are some general good guidelines
- I recommend using firehose.guide as that is what students use to plan
- This is very Course 6 leaning as that is the largest major. Course 2 and Course 6 classes tend to happen at similar times
- Advertise to the Course 6 jobs list and the Course 6 undergraduate list -- plan in advance because these need to get approved
- Ask students to dorm spam for you (your UROPs, Nina, etc)
- Ask UROP office to advertise if your class has research skills or projects
- SHASS also has good lists

First Year students

Key classes to consider for first years:

- 6.0001, 8.01, 18.02, 3.091, 5.111, 7.012, 7.013, 6.042, 8.02, 18.03, 6.009, 18.06, 6.08

Fall:

- Tuesdays and Thursdays at 10am
- Tuesdays and Thursdays after 3pm
- Wednesdays and Mondays 11am - 2pm
- Mondays and Wednesdays are the best for night classes

Spring:

- Tuesdays and Thursdays 11am
- Tuesdays and Thursdays after 3pm

Second Year students

Key classes to consider for second years:

- 6.009, 6.042, 6.006, 8.02, 7.012, 5.111, 3.091, 18.03, 18.06, 6.031, 6.033, 6.08, 6.036, 6.034

Fall:
Appendix 3: 11-6 Course Sequences

Narrative and course maps can help prospective students figure out how to major in both Course 11 and Course 11-6, but at present we only have narratives and maps for Course 11-6. Similar narratives and maps may need to be designed for Course 11, though the major is considerably more flexible.

Narrative

Ada comes to MIT with a love of transportation maps, an interest in using data, and some growing concerns about the effects of climate change on the planet. In her first semester, she completes some of the GIRs, and selects “Urban Energy Systems and Policy” (11.165) to meet her first HASS requirement (see Appendix 1 for Course 11 subjects listed as HASS). Excited by the possibility of using her technical abilities to improve energy systems, she takes a UROP in the spring, where she helps develop an online tool to help local governments track energy use. (She also completes her remaining science GIRs, as well a 6.00 to sharpen her programming skills). At the end of the year, she declares 11-6 as a major and requests an advisor in Course 11.

In her sophomore year, Ada completes most of the foundational work on the “course 6” side of the major: 6.006, 6.009, 6.008, as well as math (6.042) component. To balance all of this quantitative/technical coursework, she also takes a pair of HASS electives, as well as “Introduction to Urban Design and Development” (11.001), which meets her second CI-H requirement; for her final project, she develops a conceptual plan for an integrated, intelligent personal transit system for a small city and analyzes the costs and energy savings when compared to existing models. The possibility to beat the “zero sum game” through better design and coordination excites her, while the challenges of thinking through the requirements of her proposed solution pushes her to think more deeply about questions related to scale in urban science.

As a junior, Ada’s coursework helps her make the transition from an “engaged tinkerer” to an “urban scientist,” providing the statistics and analytical tools she needs to put data
into action. By learning advanced math and probability, as well as spatial mapping and analysis techniques, she is able to model complex urban systems and explore the ways infrastructural, operational, and policy change might affect --- and can ideally improve -- the production and delivery of energy to our cities. During her junior year, Ada spends 8–10 hours a week in an internship with the city of Boston’s Urban Mechanics Program, working on a series of applied problem-solving assignments with a team of students, under the direction of the internship coordinator in the Mayor’s Office. In the summer between her junior and senior year, with help from the DUSP Career Development Office, she finds a summer job in Mexico City, working to advise the city on the implementation of a new autonomous vehicles program.

Ada’s senior year builds on all of her foundational and exploratory work, as well as her experiences in the field in the United States and Mexico. connecting mind and hand to design, build, and test new data tools for use by urban planners and the energy utility industry. In her fall project/client based Urban Science course she works with a team to develop new crowdsourcing tools to track energy use in data-poor African cities, and begins to recognize the tremendous potential for energy efficiency improvements in the developing world. In the spring she works closely with a professor in course 11-6, who mentors her capstone project, resulting in a prototype and a business plan for a tech startup that wins a prize and seed funding from DesignX the venture accelerator in the School of Architecture and Planning.
Sample course map

**First-Year**

**Fall**
- 8.01 Physics I
- 18.01 Math (Calculus)
- HASS Elective (possible 11.6)
- First-year Discovery Subject

**Spring**
- 8.02 Physics II
- 18.02 Math (Calculus)
- HASS Elective (possible 11.6)
- 18.003/18.002 Intro to Programming

**Sophomore**

**Fall**
- 6.041(d) Mathematics for Computer Science
- REST Biology
- 11.001 (PASS) Intro to Urban Design and Development
- Elective

**Spring**
- 6.0005 Fundamentals of Programming
- 6.0006 Intro to Algorithms
- REST Chemistry
- 18.967 Urban and Environmental Technology Implementation Lab

**Junior**

**Fall**
- 6.021 Elements of Software Construction
- 6.258 Intro to Inference
- REST
- HASS Elective

**Spring**
- 11.148 Urban Planning and Social Science Laboratory (C-S4)
- Advance CS Elective
- 11.962 (K496) Making Public Policy
- HASS Elective

**Senior**

**Fall**
- Urban Science Elective #1
- 6.097 Undergraduate Research in EECS
- Urban Science Elective #2
- HASS Elective

**Spring**
- Urban Science Elective #3
- 6.097 Seminar in Undergraduate Advanced Research (C-G)
- Elective
- HASS Elective