Academics at MIT

2018 Orientation

Ian A. Waitz, Vice Chancellor
Kate Weishaar, FYE Coordinator
Agenda for today

• Core curriculum (GIRs) from 30,000 feet
• New GIR experiment!
• Some advice
  - Explore, get calibrated, ask for help
• Q & A with Kate, Noah, Skye, Edward
Navigating your choices

guidebook app helps you...

• Understand core requirements
• Browse exploratory classes
• Find academic & other useful resources
• And much, much more!
MIT is like this ...
General Institute Requirements

- Humanities, Arts, and Social Sciences (8 subjects)
- Communications (4 subjects)
- Science, Math, Engineering (6 subjects)
- Lab (1 subject)
- Restricted Electives in Science and Technology (2 subjects)
- Physical Education (8 points + swim test)

http://catalog.mit.edu/mit/undergraduate-education/general-institute-requirements/
Quick poll

• How many of you came to MIT for its exceptional educational opportunities in the humanities, arts, and social sciences?

• One of the most important things you will learn to do at MIT is to think in multiple dimensions about very complex problems.
Humanities, Arts, and Social Sciences (HASS) requirement

Total: 8 subjects

Distribution (3)
- Humanities
- Arts
- Social Sciences

Concentration (3-4)
- Conc. Subject 1
- Conc. Subject 1
- Conc. Subject 1
- Conc. Subject 4

Elective (1-2)
- Elective 1
- (Elective 2)
In the Arts, you can take a Music & Technology class with new media pioneer Eran Egozy...

“Technology and humanity are now deeply interlinked. It’s important for people with a technical or scientific degree to be immersed in the arts.”

ERAN EGOZY ’95, CO-FOUNDER OF HARMONIX
and create works in MIT’s new theater building with award-winning directors and designers.

MIT is ranked No.2 worldwide for the Arts and Humanities.

TIMES HIGHER EDUCATION WORLD UNIVERSITY RANKINGS, 2018
In the Social Sciences you can discover how to use economics to alleviate global poverty (14.73)...
and learn how to help safeguard democracy in a Political Science class on data and politics.

MIT ranked No.2 in the world for the Social Sciences

Times Higher Education, World University Rankings, 2017-18
In the Humanities, you can delve into the ethics of climate issues in a philosophy class (24.07)…
explore how gender, race, abilities and other aspects of identity affect your world...
and prepare for a successful MISTI internship, pretty much anywhere in the world.

Students call the MISTI experience transformative
Or explore just about *anything*.

Broad range of great HASS classes, such as...

- The Art and Science of Negotiation
- Making Books in the Renaissance & Today
- Africa for Engineers
- Women and War
- Science Writing in Contemporary Society
- Games and Culture
Communication requirement

• A critical tool for sharing your ideas with the world and making an impact!

• Many HASS classes fulfill the requirement

• One per year
  – two in HASS (CI-H) fulfill part of the HASS GIRs
  – two in major (CI-M) fulfill part of the major reqmts
Student-reported change in abilities at MIT

Thinking analytically and logically
Understanding and using quantitative reasoning and methods
Thinking critically
Ability to learn on your own
In-depth knowledge of a field or discipline
Understanding the process of science and experimentation
Planning and executing complex projects
Ability to use the techniques, skills, and modern tools...
Career- or work-related knowledge and skills
Creating original ideas and solutions
Functioning effectively as a member of a team
Conducting scholarly research
Judging the merits of arguments based on their sources, ...
Evaluating the role of science and technology in society
Relating well to people of different races, nations, and religions
Leadership skills
Understanding the complexity of social problems
Acquiring broad knowledge across a number of fields
Developing global awareness
Communicating well orally
Developing self-esteem/self-confidence
Developing or clarifying a personal code of values or ethics
Constructively resolving interpersonal conflicts
Placing current problems in historical/cultural/philosophical ...
Writing clearly and effectively
Critical appreciation of art, music, literature, and drama
Reading or speaking a foreign language

Critical thinking, problem solving, learning on your own, in-depth knowledge of field, teamwork, creativity, research, etc.

Oral + written communication

Very much ➜ Quite a bit ➜ Some ➜ Very little or none

Source: MIT Senior Survey
Physical Education requirement

- 4 classes and the swim test
- Don’t leave it until the end!
- ICYMI: Pirate Certificate fulfills requirement

MIT offers Pirate Certificates?
## Science, Math, Engineering requirements (SME GIRs)

<table>
<thead>
<tr>
<th>Physics 1 (Course 8)</th>
<th>Math 1 (Course 18)</th>
<th>Chemistry (Course 5 or 3.091)</th>
<th>Biology (Course 7)</th>
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<tbody>
<tr>
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<tr>
<td>Physics 2 (Course 8)</td>
<td>Math 2 (Course 18)</td>
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First-year Physics

Students with less preparation

- **8.01L**: Same material as 8.01 with more gradual learning curve
- **8.01**: Standard version in Technology Enabled Active Learning (TEAL) format
- **8.012**: More in-depth, harder problems
- **8.02**: Integral formulation in TEAL format
- **8.022**: Differential and integral formulation

Students with more preparation

- Classical Mechanics
- Electricity & Magnetism
Math diagnostic exam

What is it? A tool to evaluate math preparation and offer guidelines regarding which physics class fits students best.

Three scores determined from distribution:

- **Low**: If below this, 8.01L is strongly recommended.
- **High**: If above this, 8.012 is allowed.
- **Very High**: If above this, 8.012 is recommended.
CORRELATION BETWEEN SCORE ON MATH DIAGNOSTIC EXAM AND PERFORMANCE IN FRESHMAN MECHANICS

<table>
<thead>
<tr>
<th>Probability of not passing, or dropping out of, 8.01 for scores in indicted range</th>
<th>MDE Score</th>
<th>Averages for students passing and not passing different versions of freshman physics</th>
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<tbody>
<tr>
<td>2%</td>
<td>100</td>
<td>&lt; 8.012, PASS &gt;</td>
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<td>10%</td>
<td>90</td>
<td>&lt; 8.012, DNP OR LEFT &gt;</td>
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<td>17%</td>
<td>80</td>
<td>&lt; 8.01, PASS &gt;</td>
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<td>70</td>
<td>&lt; 8.01, DNP OR LEFT &gt;</td>
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<td>52%</td>
<td>60</td>
<td>&lt; 8.01L, PASS &gt;</td>
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<td></td>
<td>50</td>
<td>&lt; 8.01L, DNP OR LEFT &gt;</td>
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Math GIRs

• **18.01**: Single-variable calculus
• **18.02**: Multi-variable calculus
• **Intermediate Option: 18.01A + 18.02A**
  - 18.01A: 6-week review of single-variable calculus
    Focus on material not covered in Calc AB
    Finishes in middle of fall term
  - 18.02A: Normal speed 18.02, runs through IAP
  - Entry requirement for 18.01A:
    5 on A/B portion of AP exam
    or pass first half of 18.01 ASE during Orientation (happening now)

Note: Take 18.02 early if interested in pursuing an engineering major.
Chemistry

Three subject options

• 5.111 Principles of Chemical Science
• 5.112 Principles of Chemical Science
• 3.091 Introduction to Solid State Chemistry

All cover material beyond AP chem (see link in guide!)

• Chemistry ASE is offered for students with an extensive chemistry background
• 5.111 or 5.112 Important for Pre-Health majors
• 18.01 ASE during Orientation (happening now)

Note: Take early if interested in pursuing a chemistry or life sciences-related major.
Biology

3 Fall Subject Options:
• 7.012: (Lottery for admission): Genomics, cancer
• 7.015: small course, module-based learning focused on specific topics of interest
• 7.016: Chemical biology, developmental biology

2 Spring Subject Options:
• 7.013: Human disease, development
• 7.014: Ecology, biosphere

Note: Take early if interested in pursuing a life science major.
The "Bold Experiment"
An exciting time at MIT ... and what it means for you
Challenges in transforming the first-year at MIT

• We didn’t have consensus on the needs
• Owned by everyone, owned by no one
• First-year ≠ GIRs, but neither can be considered in isolation
• We tend to focus on content/curriculum more than pedagogy and broader learning outcomes
• It is a very hard problem
Change requires (at least) three things

• Communication + stakeholder engagement
• A clear understanding of the needs
• Good ideas that are rigorously evaluated

In true MIT fashion, we created a design class to take on these goals: **Designing the First Year at MIT**

*Offered Spring 2018 (only)*
Key needs identified by the "Designing the First-Year" team

• More support for choosing a major / encouraging intellectual exploration

• Advising, advising, advising (vital in the first year and beyond)

• Feeling inspired by a topic / the love of learning

• More flexibility, fewer GIRs to enable above
A good idea rigorously evaluated

As first-year students at MIT, you are uniquely qualified to help us test one of the big questions from the class:

What happens if we make the SME GIRs pass/no record any time they are taken?
A new “Typical Schedule”

SME GIR
SME GIR
SME GIR
CI-H or other random HASS
Advising Seminar/Other

SME GIR
SME GIR
12 units of Academic Exploration
Any interesting HASS – treat this as Concentration Exploration
Advising Seminar/Other
Specifics of the experiment

• 3 SME GIRs P/NR after first semester
• Designate P/NR or grades by add date
• Once you designate a subject, you can retake it without using up another P/NR.
  – Note: This does not apply to NRs from first semester or A/B/C/NR. If you want to retake one of these classes on P/NR, you must use one of your three slots.
Benefits

• Less pressure to take 3-4 GIRs in the first semester: GIRs can still be P/NR later, so why not use the time in the fall to explore?

• GIRs that won’t bring down your GPA: Focus on learning new things instead of stressing about grades.

• Freedom to challenge yourself: Prepared to take advanced versions like 5.112 or 8.022 but thinking that you’ll get a better grade in the standard version? Now you can take the chance!
Some advice / things to keep in mind

• Many majors have GIRs as pre-requisites Check out the roadmaps for the majors you’re considering; take the GIRs you need in the first-year

• Take at least two classes on grades in the spring of your first-year
Sophomore coursework is often significantly harder, and you don’t want it to be your first time seeing grades.

• Not all major classes are suitable
We worked with departments to compile a list of classes that are. If you choose to go off-list, know that professors can and will enforce pre-reqs.
Why explore?

8% of you are unsure of your major...

and only 48% are confident that your current choice will be the right major for you.

85% say that you are open to having your mind changed about your planned major.

“College is a place to change as a person.”

Data from Survey of New Students 2018
Why explore?

98% of you are interested in exploring more deeply a major that you are considering.

86% of you are interested in exploring more deeply academic majors that you have not previously considered but sound interesting.

Data from Survey of New Students 2018
Moreover...

Within 5 years of graduating, 75% of MIT undergrad alums are working in a field not directly related to the major they studied at MIT!
Why Explore?

How to Explore

1. Talk with people. Start with the Academic Expo, but don’t stop there!
2. Participate in an advising seminar
3. Do a UROP in a department that interests you
4. Do an Internship/Externship
5. Try out non-credit activities
6. Take exploration classes

(See the orientation guide or Office of the First Year website for a list!)
Academic exploration classes

THERE ARE A LOT! TAKE ADVANTAGE OF THEM!

(see Guidebook or uaap.mit.edu/sites/default/files/Documents/MasterExplorationClassList.pdf)
Have more than one interest? You’re not alone.

• **100%** of students complete a HASS concentration. Many HASS concentrations are only 2 classes away from a minor.

• **16%** of students double major

• **27%** of students complete at least 1 minor, 3% complete 2

• **23%** of students who double major also earn at least 1 minor

• MIT also offers **composite majors** (e.g. 5-7), **flexible majors** (e.g. 2A), and **interdisciplinary majors** (e.g. 21E, NEET, etc.) that allow students to pursue multiple interests without the challenge of completing two full majors.
Minors by primary major*

*Including most popular minor for majors where over 30% of students complete a minor
Double-Friendly Majors

Yes, you can double major in any department, but some combinations are easier than others.

Total Degrees (For comparison)

Double Majors Awarded

Percent of Students Who Double Major

16%
Double majors by Course with popular pairings

Total Course 6 degrees awarded = 2024
Popular Doubles with Minors

Minors Key:
- Economics
- Other HASS
- Sci. & Eng.
- Sloan
- Interdisciplinary
Quick poll / Check-in

How many of you are feeling a little overwhelmed right now?

That’s okay. It’s normal. Your advisor and the extended advising staff, fellow students, and faculty can help you navigate.
Academic advice is everywhere!

- Your Advisor / Associate Advisor
- Global Education & Career Development (GECD)
- OFY Staff: To make an appointment, write to firstyear-www@mit.edu
- Undergrad administrators in each department
- UROP Office
- Alumni Advisors Hub
- OME Mentor Advocate Partnership (MAP)
- Orientation Leaders
- Resident Peer Mentors
- First Generation Peer Mentor Program
- International Students Association Mentorship Program
Finding your path is a process
Keep in mind

- **You** got in to MIT. (Really!)
- The first-year can set you up for ANY major.
- **45%** of first-years add/drop subjects in the first five weeks.
- **10%** of students switch majors (after declaring).
- Standard practice is to choose your major by the end of spring term of your first year ...but you have more flexibility than that if you want it!
Early sophomore standing eligibility

Sophomore Standing: Based on students completing 96 units including one CI-H (including AP, ASE, and transfer credit).

- 33% were eligible last year, half elected sophomore standing
- Notified in December, decide whether to accept in January
- There are pluses and minuses
The most important advice...

Get calibrated

It might take one, two, or even three semesters to get used to MIT
Just ask

Vice Chancellor
• My office hours (dates/times will be posted)
• My email: iaw@mit.edu

First Year Experience Coordinator
• Kate’s email: katew@mit.edu

Primary Resources
• Your Advisor / Associate Advisor
• MIT Career Advising & Professor Development
• OFY Staff: To make an appointment, write to firstyear-www@mit.edu.
Let us know how we can help

Your advisors will ask you about…

- your personal objectives for the first year
- your academic objectives for the first year

• Please think about these (it is important)
Edward Fan  
**Junior, Course 6-3 (Computer Sci.)**

Simmons Hall President  ·  Creator of firehose  
TA for 6.172 (Performance Engineering)  ·  Lab Asst. for DFY class  
Interned at Bloomberg, Amazon, & Jane Street  
was Course 16 (AeroAstro) once  ·  starts 1st UROP this fall in CSAIL

Noah McDaniel  
**Junior, Course 11 (Urban Planning)**

Minor in EAPS (12)  ·  Concentration in Econ (14)  ·  Interests:  
transportation planning, education policy, environmentalism,  
development economics  ·  Member of Roadkill Buffet, UA, CUP, & CAP  
SAE treasurer  ·  Lab Asst. for DFY class

Skye Thompson  
**Sophomore, Course 2A-CIR (Controls, Instrumentation, and Robotics)**

Taught robotics in Rwanda last IAP  ·  MAS Learning Community  
Teaching ES.S71, a seminar about Big Ideas  ·  DFA Project Lead  
UROP in CSAIL’s Learning & Intelligent Systems Group  ·  SIPB  
Spinning Arts (fire!)