Academic and Residential Life: Challenges and Responses to COVID-19

Cynthia Barnhart, Chancellor

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Life at MIT, Fall 2020

Some Facts

• Campus academic capacity reduced (maximum of ~4000-student capacity at any time, maximum lecture room 50-70 people)
  • A significant percent of subjects taught on-line
  • Campus access will be restricted to certain students at certain times for certain locations

- Practice physical distancing (6 feet apart) inside and outside
- Quarantine for 14 days upon entering state
- Require face covering
- Handwashing or sanitizing hands made available throughout campus
- Increased cleaning and sanitation
- Required testing, tracing and treatment protocols for being on campus
Adapting the MIT campus footprint for campus-based learning in Fall 2020

4041 learner capacity, daily max
363 learning spaces
6 learning space types
3 COVID-adjusted room sizes
1 goal: educational excellence

Relocating student classes within a single building sector each day maximizes learning while minimizing mixing (risk of community spread).

Facilitates hands-on-campus learning when lab, project, and performance key to educational outcomes.
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• Reduced graduate and undergraduate residence hall capacities
  • Maximum capacity of residences and FSILGs in fall at about 50% of the UG student population
    • Will increase when construction of new residence halls complete, expected end of year 2020
  • 85% of graduate student housing capacity available

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2020 Fall Residential Capacity

~4500 registered undergraduates per semester
Shortage of ~1800 beds in the fall

Ways to close the ~1800-bed gap

1. Rent hotels or apartments
   • Potential for 1000 beds in nearby and local hotels

2. Relax or transform density rules (pods, fixtures, etc.)
   • Reduces isolation, disease spread implications

3. Suspend on-campus housing guarantee for upper-level students
   • Responsibility to greater Boston community?

4. 2-Semester Model: Limit students to one semester on-campus and one-semester remote (no access to campus)

5. 3-Semester Model: Spread two semesters of subject offerings over three semesters
   • Increases residential and academic capacity by 50%
   • Maintains on-campus access for two semesters for each student
2020 Fall Residential Capacity

3-Semester Model (S1, S2, S3)

~2250 registered UGs in S1
[25% UGs registered in Semester 1 (S1) and Semester (S2); 25% UGs registered in S1 and Semester 3 (S3); 50% UGs registered in S2 and S3]

Bed shortage = 0

Matching the number of registered students on campus with the number of available beds in MIT housing

- ~50% of students in semester 1 (S1)
- Adjust the number of students registered in winter and spring semesters to reflect changes to available capacity
  - Likely scenario: 75% of undergraduates registered in Semester 2 (S2) and in semester 3 (S3)
    - New residence halls on-line by end of December 2020
    - Relaxed social-distancing protocols for students with known immunity
  - Optimistic scenario: 100% of undergraduates registered in Semester 2 (S2) and 50% in Semester 3 (S3)
    - Availability of treatments (therapeutics, vaccines)
The 3-Semester Model: Optimizing the Educational and Residential Experience

3-Semester Model:

- **Decide** for each subject offering, which one semester it will be offered
- **Decide** for each student, which two semesters the student is on-campus (and which one semester the student is remote)

Some possible implementations:

1. **INDIVIDUALS:**
   - Decide which subset of individual students is on-campus together (and which is remote)

2. **MAJOR-CLASS YEAR:**
   - Decide which grouping of students by program-year (e.g., third-year 6-3 (primary) majors) is on-campus together (and which is remote). All first-years are a program-year cohort.

3. **CLASS YEAR:**
   - Decide which grouping of students by class year (1st-, 2nd-, 3rd-, and 4th-years), and which is remote.

- For the purposes of illustration, we considered the following class-year combination:
  - 1st-years on-campus semesters 1 and 3 (remote semester 2)
  - 2nd-years on-campus semesters 1 and 2 (remote semester 3)
  - 3rd-years on-campus in semesters 2 and 3 (remote semester 1)
  - 4th-years on-campus in semesters 2 and 3 (remote semester 1)
Optimization Results

Data 2020FA and 2020SP
- 4,278 students
- 588 subjects in 720 offerings
- 5.2 required subjects per student (“common major subjects” + GIRs + lab/design/project/performance subjects)

Results
- Number of subjects taught in fall (with smaller differences for other semesters)
  - 369 taught in 2-semester fall
  - 124-213 taught in the 3-semester fall
- Percent of subjects— commonly taken in a major or requiring on-campus presence— that are taught when the student is on-campus
  - 51-59% for 2-semester model
  - 92-96% for 3-semester model
- Number of subjects that have the potential for components (or all of the subject) to be taught fully in-person
  - 108-168 in the 2-semester model
  - 501-518 in the 3-semester model

<table>
<thead>
<tr>
<th>Number of Semesters</th>
<th>Student Assignment Approach</th>
<th>‘Required’ Subjects Taught while Student is On-Campus</th>
<th>Number of Subjects Taught FA/S1</th>
<th>Offerings with &gt; 95+% Enrollment on Campus (out of 720 offerings)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Individuals</td>
<td>59%</td>
<td>369</td>
<td>108 offerings</td>
</tr>
<tr>
<td>2</td>
<td>Major-class year FA 1-2 / SP 3-4</td>
<td>57%</td>
<td>369</td>
<td>168 offerings</td>
</tr>
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<td>Class Year</td>
<td>51%</td>
<td>369</td>
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</tr>
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<td>Class year S1 1-2 / S2 2-3-4 / S3 1-3-4</td>
<td>92%</td>
<td>124</td>
<td>511 offerings</td>
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Significant contributions in generating optimization results thanks to: Dr. Julia Yan and PhD student Arthur Delarue, and Professor Dimitris Bertsimas (Operations Research Center, MIT)
# Scheduling Opportunities

## 2-Semester Model

1. Begin fall semester start of September and end instruction before Thanksgiving
   - Eliminate need for travel at Thanksgiving and end of Semester
   - Safeguards ‘second-wave’
   - Begin classes 1-week early
   - Reduce the length of the semester by 1-week to end instruction before Thanksgiving
   - Move final exams on-line, beginning the week after Thanksgiving
2. Start fall semester as late as January
   - If known by late summer that a vaccine will be available by end of fall
   - Elimination of IAP

## 3-Semester Model

1. Compress 3-semesters to begin start of Sept and end third week in June
   - Reduce the length of each semester by 1-week
   - End S1 instruction before Thanksgiving
   - Start S2 with 2-weeks of on-line instruction in December
     - Eliminates need for students to travel in December
   - Eliminate IAP
   - 2-week break for December holidays, 1-week break at end of March
## 2-Semester Model vs. 3-Semester Model

<table>
<thead>
<tr>
<th>2-Semester Model</th>
<th>3-Semester Model</th>
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</thead>
<tbody>
<tr>
<td>• For an undergraduate student registered for 2-semesters</td>
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<tr>
<td>• 1-semester on-campus, 1-semester remote</td>
<td>• 2-semesters on-campus, 1-semester remote</td>
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<tr>
<td>• Unless hotel capacity purchased</td>
<td>• Maximizes number of labs, design, project, performance, small-group discussion subjects or components of subjects to be offered in-person</td>
</tr>
<tr>
<td>• Almost all subjects taught on-line</td>
<td>• ‘Bonus’ semester allows speed-up to degree completion</td>
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<td>• ‘Tried and true’ academic schedule</td>
<td>• Added schedule complexity and extended academic year calendar, may require additional support for instruction and administrative staff roles.</td>
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</tbody>
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### Impacts

- Safety
- Quality of educational and social experience
- Mental health and wellbeing
- Numbers of students deferring or taking leaves
- Pricing