

Potential teaching scenarios for fall 2020

Physics Department

May 5, 2020

1. Fully remote.

Please give us a sense of your plans if MIT is totally remote.

The physics department has been teaching all of its classes remotely since the beginning of the COVID-19 crisis. We will use the summer to reconfigure those courses that we usually teach fall-only as fully remote courses.

Our most difficult challenge in this regard is our junior laboratory course, 8.13/8.14, which requires students to be present in the lab. Currently, this course has two remotely controllable experiments. The students spend the rest of their time on data analysis from those two experiments, as well as analyzing data from LIGO and the large Hadron Collider. We will find other data sets for them to analyze (for example, from electron scattering experiments, condensed matter laboratories, and biophysics). Over the summer, we would work to develop two more remotely controllable experiments.

Another significant challenge has been engaging students and maintaining regular attendance in online learning, especially for ungraded components of the coursework. These challenges will have to be addressed by reconfiguring certain classes (e.g., replacing some lecture time with recitations and problem-solving sessions, increasing required-attendance activities).

How can we help you?

Some crucial issues must guide our thinking for all scenarios. These include:

1. Care to ensure equity for all students, including those who manage to make to campus and those who cannot, those who can attend in-person student-faculty interactions, and those who cannot.
2. Exams and grading is a huge question in all scenarios. In spring 2020, the PE/NE/IE grading has allowed most subjects to demote the role of exams done remotely. If fall 2020 resumes online, but with standard letter grading elevates the role of exams. Clearer guidelines are needed to help instructors balance rigor and flexibility. There has been some confusion about how to conduct final exams this spring, with instructors hoping to hold finals as take-home, multi-day exams, only to learn that

this is not allowable. Online proctoring or introduction of an honor code needs to be done in an MIT-wide way and should be part of all reopening discussions.

3. Shifting more courses online will require resources to help faculty develop online materials and support their release online. Staffing classes with part-time MITxperts would ease the pain of getting classes online in a sustainable way, rather than some of the temporary measures taken in March 2020.
4. In weighing each scenario, we must balance the administrative burden on faculty, instructors, and against advantages to students and teaching and learning objectives.
5. UROPs are a unique part of an MIT education for undergraduates, and every scenario should strive to make it possible – encourage even – students being able to engage in UROPs.
6. Any scenario we choose in the early summer may change by the time the fall term starts. We should consider options for delaying the start of the semester, or for moving registration day to earlier (for non-first-years) to allow for last-minute changes.
7. Resources such as S³ and the Student Success coaching program will need to continue to be made available to students who are not able to be on campus.

The Department will continue to need support producing high-quality videos and providing technical support. We have managed reasonably well so far this term. If this fall is fully remote, many faculty members will cycle into this teaching mode for the first time. They will need to be supported.

Are there opportunities to reduce the number of subjects taught without disrupting student's fulfillment of requirements?

We will most likely reduce some subjects (most likely graduate specialty subjects) and redeploy those teaching resources to our first- and second-year courses – 8.01, 8.012, 8.02, 8.03, 8.033, and 8.04 – to increase the number of sections and reduce the number of students in each section. Our experience has been that student engagement is better in smaller groups. We would aim to have our TEAL sections be about 40 students. Currently, the number of students in each TEAL section is close to double that.

What components of your current learning objectives cannot be achieved remotely?

Our junior laboratory is a significant experience for all of our students; we cannot achieve interaction with the instrumentation in the classroom setting with technical

guidance remotely. Losing the on-campus version of this course would be a significant loss for students.

Also, several of our faculty have commented that starting remote teaching from the beginning of the term will be quite different from remote education required by a sudden emergency. This term, students and instructors had time to establish routines and relationships before the campus was closed. That lack of initial face-to-face contact and the ability to meet in person for office hours and get to know each other will be missing in the fall and is likely to harm student (and faculty) well-being.

2. Hybrid

Please give us a sense of your plans.

We envision remote teaching as a component of any possible scenario, so that has been out main focus. The bulk of our courses can be run this way, except for junior lab (8.13). With safe contact protocols in place, residential students could work with junior lab instrumentation. As in Scenario 1, we would work over the summer to develop new remote experiments. Any hybrid scenario would have to be attentive to maintaining equity among students who are physically present on campus, and those who could not be.

How can we help you?

In both Scenarios 1 and 2, we will need help developing junior lab experiments over the summer. Developing new remote experiments will require extensive on-campus presence by our junior lab teaching team. Every scenario that has a remote teaching component will have to address the considerations enumerated in Scenario 1 above.

What are the practical requirements of teaching this way?

The whole point of bringing students back to campus would be for them to interact with each other and the teaching faculty. We would see as a requirement that we have some ability for course staff (faculty and TAs) to meet with our students in a low-density way, preferably on some kind of regular basis. Our experience in Spring 2020 has shown that the several weeks of in-person teaching laid the foundations for successful remote education, by establishing connections and relationships robust enough to survive the transition to distance learning. Without a similar way of creating connections in Fall 2020, we are concerned that remote learning will not be effective.

What are the potential impediments?

Low density and social and physical distancing will be impediments since they reduce the contact time between students and faculty.

Any hybrid scenario (2,3,4) increases the administrative burdens because there is one set of students who can do things the 'normal' way (e.g., submit problem sets on paper) and another set who do things the remote way. There may need to be two sets of rules and procedures for exams and quizzes, and this could well lead to concerns on the part of students that evaluations and grading were not being done equally across the two groups. We are concerned that some kind of bias we can't precisely articulate right now will affect the evaluation of student work.

3. Socially distanced education on campus

How would you operate if there is strict social distancing required?

We would want to enable students, faculty, and TAs to meet in person regularly. We understand that this would not be exactly like the typical classroom engagement. For instance, there would be some loss of frequency of meetings because of density requirements. For us, a significant point of bringing students back on campus would be for students and faculty to be able to interact.

How can we help you?

Please make the appropriate classroom spaces available so that students, faculty, and their TAs can meet together.

What are the intended practical impediments to teaching this way?

Physical distancing requirements driven by density rules will present a significant practical impediment.

What are the practical requirements of teaching this way?

In addition to the requirements mentioned in the other two scenarios, the practical necessity of this scenario is the ability to have face to face in-person meetings between students and faculty.

What are the potential impediments?

Physical distancing and the need to reduce density will drive all the challenges in this scenario. For example, we imagine we might need classrooms to be made available, perhaps in the evening or earlier in the morning.

Administratively, creating and monitoring a classroom schedule will be extremely challenging, as more classrooms will be needed to maintain adequate space between

individuals. Attention at this level could require more instructors and more TAs simply to be present in multiple classrooms at the same time if the same number of class sections is assumed. The expectation of more class sections means teaching time, and TA time must go up.

4. Half the undergraduate students on campus half the time

It is difficult to see how MIT will divide the students, e.g., by major years, by 50% living group occupancy, by students' choices perhaps to coordinate with friends, to organize with lab class cohorts, to coordinate with affinity groups or sports teams. We do not have a good suggestion for how to accomplish this, which makes this a somewhat unpalatable solution.

Student choice or friend coordination cannot determine which cohorts return to MIT. Not all students have friend groups; those who are unconnected to others would be disadvantaged in such a system, and they are the ones who need social supports all the more. Student choice could leave many students feeling like they're not being "chosen for the team" if friend groups are the measure of how to decide. There's possibly something to be said administratively for separation by major: it would give every Department's staff one half the term to be fully engaging with all its students, and the other half to get a bit of a breather. And it's the only option listed here that has any chance of creating a sense of being within your intellectual cohort. The large number of double majors complicates Any division by major.

How would you operate the non-remote local components of your curriculum in these circumstances?

Junior lab is the only non-remote component that would require a physical presence in a teaching lab. The Junior Lab students who are on campus would work in the lab appropriately distanced from each other and their instructors, learning how to operate the instrumentation. The students who are away from campus could do the components of the class that does not need a physical presence in the lab – analyzing data, writing reports, and making oral presentations. There would be some complications for the students that are on campus the second half of the term, where we would have to rethink the order of the work.

What are the practical requirements of teaching this way?

Junior lab would undoubtedly have to be open longer hours, and that will be a strain of our junior lab staff.

What are the potential impediments?

As with previous scenarios, maintaining physical separation presents an impediment. Additionally, administrators would be required to maintain two thought-processes simultaneously, often requesting different responses to questions that come up, depending on a student is remote or on campus. Transitioning students on and off-campus every few weeks will also be a significant undertaking for everyone, especially on the staff side.

5. Three semesters.

Do you have feedback on options for which students to have on campus when?

As we said above, we don't have suggestions for how to do this.

How would you operate the non-remotable components of your curriculum in these circumstances?

We would divide the time in the junior lab as described in Scenario 3 with in a modification of what's described for Scenario 3.5.

What are the impacts on students, faculty, and staff?

This option represents a 50% increase in workload for students, faculty, and staff, and is untenable. Rearranging our courses to fit it into three terms is an enormous undertaking that will require vast effort with foreseeable and unforeseeable complications. As several of our courses are sequences, there would be tremendous difficulty in accommodating all the different paths our students follow through our major.

We would also have to consider the implications of scheduling graduate general exams, Advanced Standing Exams, and other processes that are routinely scheduled for the beginning of terms. Constructing three classroom schedules, three terms worth of faculty teaching assignments and TA solicitations, will allow less time for each process and will require that faculty and staff devote many more hours to these cyclical system tasks, detracting from time available to devote to student well-being and care, e.g. An extended number of weeks of classroom teaching risks burnout for faculty and also for staff. Vacation time would effectively all be pushed to the summer months, further compromising planning time for the next academic year. Everyone will be on hamster wheels and will not be able to get off.

6. Moving from managing to thriving

What are some department-specific learning opportunities that would be unique at this time?

Like the rest of MIT, we are learning how to teach remotely. We are managing, and we see a fall term with a significant component of remote teaching as simply continuing to

manage. We will continue to innovate and improve our remote teaching and support our community as best we can, but we do not see how we thrive in this scenario.

What are some of the broader and potentially MIT wide learning opportunities?

We believe that the philosophy at MIT should be that we should strive not to do anything in a mediocre way. It would be preferable to cut back to a core of things that can be done excellently, if possible, rather than to take unsustainable actions to fit in as much as possible. Let's think about what we can do excellently, and focus on those things, with the explicit understanding that there are other things that we will not get done.

We should also acknowledge the tremendous pressures on so many members of our community. With the uncertainty of schools reopening for children, with job losses and economic uncertainty ahead, with the mental health issues wrought by the pandemic, to name just a few, our faculty, staff, and students are all under different pressures. Optimism is a necessary part of the mix to get through this, but these are not conditions that allow most people to thrive.

Feel free to share any other thoughts

The experience of the last term has taught us the value of in-person education. It is why people come to MIT, and the entire architecture at MIT, the dorms, the infinite corridor, the classrooms, the labs, everything are the bring people together. We invite the administration to take this into careful account and work out ways so that students, faculty, staff can be together as much as possible.