Below is an outline of approaches (with my editorializing) to apply to remote teaching and learning. From my perspective, the overall approaches are not that different from what we should be doing for all of our teaching, irrespective of the medium or format. Nonetheless, there are particular challenges associated with remote teaching. Some of our approaches need to be modified to acknowledge and mitigate those challenges.

The second page includes links to some of the multitude of resources that are available.

For teaching and planning:
We should be teaching ALL of our subjects synchronously and recording them for students who are unable to attend the synchronous classes. Pre-recorded materials can make excellent supplements, but are not good replacements for synchronous teaching.

- **Show you care;** this should be the case regardless of in person or online! Feedback from students makes clear that one key way to show we care is to teach synchronously, and to engage the students. This is far preferable than asking them to watch polished videos of whole class periods that can be used for anyone anytime.
- **Show up;** we show up on campus; we should also show up online; this means much of our teaching needs to be synchronous, in real time, but also recorded
- **Create a community;** this happens naturally on campus, but is much more challenging with remote teaching. There are many ways to do this and we will provide more on this later
- **Clear organization and communication;** always important, but even more so when online

- **Define learning goals and objectives**; Write them out to share with the students. This also helps determine how to approach remote teaching.
- **What teaching and learning activities help achieve the learning goals and objectives?** For example, use synchronous time for discussion and interaction with students, even in large classes. Students who observe but do not speak are still engaged in active learning; the same as at a faculty meeting or lunch where many do not ask questions or comment, but are still engaged in active learning.
- **How to assess students' learning?** This is particularly challenging with remote teaching. Useful approaches include more distributive types of evaluations (some of what we do anyway): problem sets; take-home exams that are not timed; presentations; writing assignments; several short exams; and of course more traditional exams, but in an online environment
- **Start preparing as soon as possible, especially if you want help.** Mary Ellen and her team are really good resources. They can work with us individually, but not if we all wait until close to the start of the semester.
- **Note that this Zoom stuff is also challenging for many of our students.** We need to be inclusive in our methods and approaches. For example, some students may not want to talk in Zoom. They might be uncomfortable having the camera on. This is particularly true for students living in crowded quarters. Use of the chat and breakout groups can help with this.
- **Develop a good sense of the strategy and approach to teaching and learning.** Once this is in place, or at least outlined, then is the time to think about the particular medium and technology. As daunting as the technology might appear, it is not that challenging. (e.g., In early March, I had no idea what Zoom was. For better or worse, now I know….)
- **Contingency plans;** It is critical to have contingency plans for those teaching, our students, and the methods and technology. This is similar to normal teaching, but the chances of people becoming ill and missing a couple of weeks is much greater now. Also, this technology is a bit more complex than teaching with chalk and/or a projector in a classroom.

My understanding: there are two general types of technologies to consider, and multiple options for each; 1) video conferencing/teaching (e.g., Zoom, Webex); 2) course/learning management systems, LMSs (Stellar, MITx, Canvas). Some LMSs have capabilities for grading and discussion forums. There are also separate tools for specific functions, for example Gradescope for grading and Piazza for discussion forums. Current LMSs can integrate some of these other utilities.

MIT Remote Teaching and Learning Websites; For all of MIT
- Official site with general information: http://teachremote.mit.edu/:
- Site for anyone to post information: https://open.mit.edu/c/teachremote
- Site for rRecommendations for sStudents: http://learnremote.mit.edu/

Created by and shared with Biology for March 2020; this will be updated more for fall
- Recommendations: https://docs.google.com/document/d/1d6qXI-PeNG3740RpDNp4ksBTGpDXJ639a74Jw3p0t98/edit?usp=sharing
- Instructions on recording from your computer or posting via YouTube: https://docs.google.com/document/d/1ZN2H53g0aW3MC9Ln2a0wOxVO68LXHhNoLAGWpqvbJAU/edit?usp=sharing (note: this was important for the spring 2020; for fall 2020, this can be useful for providing students with supplemental information and posting videos and demos.

Links for additional information
- share screen, and still see as many students as possible, if using one device (computer), this is the setting to change in Zoom: **https://support.zoom.us/hc/en-us/articles/115004802843-Side-by-Side-Mode-for-Screen-Sharing**
 (note: if you are using two computers, or a computer and phone, then this is not needed; you would log in twice and use one device for each function)
- How to write (paper, physical board, tablet) while teaching from home: **https://www.edsurge.com/news/2020-04-22-a-quick-start-instruction-manual-for-teaching-from-home**
- A collection of 79 (as of May 3, 2020) relatively short descriptions (~1 page) about various aspects of online teaching and learning; Several from Biology; many have interesting suggestions and approaches that are broadly applicable.
https://openlearning.mit.edu/mit-faculty/residential-digital-innovations

Some tool/technology options (and comments)
- **Synchronous meetings:** Zoom or Webex (most use Zoom); Works for class time, office hours, recitations; Ability to record is built-in
- **Student submission of materials:** PDFs for problem sets, writing assignments, exams: MITx, Stellar, Gradescope, and available soon, Canvas. Canvas, I'm told, has more functionality than Stellar, is used as a course management system at Harvard and many other schools. Dropbox is also useful for submitting different types of files and can be used for classes.
- **Grading of problem set or exam PDFs:** Gradescope
  http://kb.mit.edu/confluence/display/istcontrib/Gradescope+Landing+Page
-Timed Exams: MITx or Gradescope (contact Mary Ellen for MITx)
- **Discussion forum**: Piazza
  http://kb.mit.edu/confluence/display/istcontrib/Piazza+Landing+Page#PiazzaLandingPage-Overview
- **Collaboration** to write, present, analyze data: Google Docs, Google Sheets, Google Slides

- **Canvas** has some (all?) of these capabilities, and we will learn more about that in the coming months. MIT will hire someone to help those who want to switch over to Canvas over the summer.

Stellar, MITx, Canvas, Gradescope, Dropbox, Zoom, Webex, all use MIT login and protect students' privacy.