

Reconsidering Assignments & Assessments

Revise assessment and assignments in response to revised learning outcomes and remote learning context. Before you consider your student assessments you'll want to revisit your goals for student learning. Due to the constraints and affordances of remote instruction - it is likely that you will need to modify and/or fine tune these goals. Start by Identifying the goals that are most important for students to achieve (most fundamental or pivot for future learning; most critical for downstream subjects; most essential for an informed citizen; and *prioritize* those in your assessment strategy.

As you refine your learning outcomes, you can begin to consider what assessments, assignments, and activities support the achievement of these outcomes in a remote-learning context. Some activities that work well in a traditional classroom or lab may not work well remotely. Think about why you had originally wanted students to participate in these activities and identify alternative ways to achieve those intended learning outcomes in a remote context.

For assignments or projects initially designed as collaborative, consider possible barriers (e.g., students distributed across time zones), whether the same goals can be met individually, or if students can effectively collaborate through a combination of tools (e.g., Canvas, Explain Everything, Dropbox, Google Docs, Piazza, Slack, Zoom, etc.).

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General Considerations:

- **Emergency Grading Policy:** The [grading policy for the fall 2020 term](#) includes traditional letter grades with some significant variations. As stated in the Emergency Regulations for fall 2020: “For all subjects, the grades that will be recorded include A, B, C, D/NE, and F/NE, where NE indicates that no record will appear on the external transcript. No academic credit will be received for recorded grades of D/NE and F/NE. However, students assigned a grade of D/NE will have the option of electing to accept a grade of D, which will carry with it the associated units since that may be desired in order to fulfill a requirement for graduation. This election must be made by Add Date of the Spring 2021 semester (Friday, March 5, 2021). In addition, sophomores, juniors, seniors, and graduate students may elect to have one subject graded PE/NE in the fall semester.”

As in traditional semesters, instructors will not know which students have elected the PE/NE grading option either from class lists or at the time of grade submission.

- **Types of assessments:** Prioritize frequent, low-stakes assessments/feedback (see below, for assessment suggestions based on subject size and format. Higher stakes assessments (e.g., cumulative exams) on a specified day will present challenges for some students – depending on their circumstances on the day in question, and may unfairly disadvantage certain students in this time of disruption. It is important to note the Institute-wide restrictions imposed on changes to assessments:

At the beginning of a subject, instructors must provide students information regarding the work required for the subject. This includes the number and kinds of assignments, the schedule of tests and due dates for major projects, whether or not there will be a final examination, and the grading criteria and procedures to be used. For Fall 2020, instructors must also indicate how attendance at class meetings will figure into the final grade.

Instructors should describe their expectations for students’ participation in synchronous elements of a class, both remote and in-person, as well as any expectations related to the unique teaching and learning circumstances for both in-person and remote components of subjects. For example, instructors who are planning assignments that will require undergraduate students to use iPads should describe this.” In addition:

“Final exams may not be canceled once they are announced and the time of a final exam may not be changed after the schedule is published. Any subsequent changes to what is announced during the first weeks of a subject must be approved in advance by the Chair of the Faculty (facultychair-reply@mit.edu). Of particular note is that instructors may not increase the number of assignments or quizzes/tests/exams.” Finally,

“The choice of format of the final exam must be announced and expectations must be clearly stated no later than Drop Date (November 18, 2020)”

- **Transparency:** For any assignment or assessment - strive for transparency and help students to understand your expectations and rationale for its inclusion in the subject. Clearly articulate:
 - The learning goals for the assignment
 - Your expectations for the assignment (what, exactly, will they be doing?)

- The criteria by which they will be evaluated (provide rubrics and/or examples of high-quality work.¹
- The Transparency in Learning and Teaching Network has created this [Transparent Assignment Template](#) to help instructors plan and articulate their goals, tasks and criteria for assignments.
- **Student motivation:** consider ways to keep students engaged. Connect course concepts to real-world examples or topics your students are interested in, use puzzles and friendly competitions (with prizes if possible, see the “3.016 Case Study” below) to encourage students to engage deeply with course content, showcase unique problem solving approaches used by students, and provide many opportunities for student-student and student-teaching staff interaction.
- **Student input:** partner with students in designing an appropriate final assessment. This creates an opportunity for students to communicate the technical capabilities available to them which might impact their work on the final assessment and builds student buy-in to changes to the class.
- **Student well-being:** consider how different options for summative assessment might affect student well-being. This table nicely summarizes how [different summative assessment strategies impact student well-being](#) (University of California at UC Davis).
- **Academic integrity:**
 - **Include explanation components:** requiring that students explain their approach, reasoning and/or uncertainties can increase academic integrity. This strategy can be applied to any quiz exam, quiz or pset question and works for any format for student response (text-based, equation-based, coded, or orally presented). Even multiple choice questions can be modified to require an explanation-component.
 - **Create non-Google-able questions and prompts:** base questions on specific discussions from class; appropriate student questions, or demonstrations gone awry.
 - **Select assessments that require deeper levels of cognitive processing:** asking students to engage in higher order processing (compare, analyze, evaluate, recommend) requires them to engage with the material at a deeper level and reduces students’ ability to “find the answer” online.
 - **Implement a code of conduct:** consider asking your students to adhere to a code of conduct for your course/assessments. Studies have shown that students that are asked to sign a code of conduct prior to taking an exam, are less likely to engage in academically dishonest behavior.² For an MIT example, see the “2.086 Case Study” below. Alternatively, you can include a cover page in your exam that specifies the collaboration policy, instructions for exam completion and submission, and the following statement:
 - “Please sign the following statement to verify that you have read and abide by the code of conduct for this subject: *By affixing my name to this paper, I affirm that I have executed the examination in accordance with the code of conduct for this subject_____.*”

¹ Winkelmess, M., Bernacki, M., Butler, J., Zochowski, M., Golanics, J., & Weavil, K.H. (2016). A teaching intervention that increases underserved college students’ success. *Peer Review*, 18(1-2). Available: <https://www.aacu.org/peerreview/2016/winter-spring/Winkelmess>

² Gurung, R. R., Wilhelm, T., & Filz, T. (2012). Optimizing Honor Codes for Online Exam Administration. *Ethics & Behavior*, 22(2), 158–162. <https://doi.org/10.1080/10508422.2011.641836>

For any size:

For all classes:

- **Series of quizzes instead of a final:**
 - Offers multiple data points for assessment.
 - Lowers the stress of having a single final summative assessment.
 - You can always reserve one question in each quiz for previously tested content to make sure students have not forgotten it.
- **Omit quizzes and exams:**
 - Reweight and revise your problem sets to make them more substantial.
 - Side-steps the challenge of retrofitting an old exam format to remote teaching or creating a new assessment from scratch.
 - *Example at MIT: in the spring of 2020, 18.03 (Differential Equations) omitted the remainder of the quizzes and the final altogether. Final grades were based on the problem sets and the first midterm (which was given when students were on campus).*
- **[Two-stage Exams](#)**^{3 4}: As the name implies - two-stage exams (aka collaborative testing or cooperative exams) are administered in 2 stages:
 - The first stage closely resembles a standard exam - with students working independently to provide responses.
 - The second stage (which follows immediately after the first) allows students to work in groups or teams to revise and refine their answers from the first stage.
 - Multiple studies have shown enhanced learning gains in students who participate in two-stage exams (compared to those who take only a single-stage test).
 - By inclusion of the second-phase, students receive immediate feedback from their peers (as opposed to the delayed feedback generally associated with midterm or final exams); engage in explanation and debate; and see alternate approaches to problem solving - all activities that can support and strengthen learning and build more robust understanding.
 - The weighting of the scores on the 2 stages can be tailored as needed based on the learning goals and the scope of other assessments in the subject.
 - [This video from CWSEI](#) illustrates the 2-stage exam process
- **Peer teaching:**
 - If your class size allows, have students present a concept or a solution to a problem to their peers. You might structure this by assigning students specific concepts or problems, or you might ask students to develop their presentation based on certain criteria. This activity could also be

³ Gilley, B. H., & Clarkston, B. (2014). **Collaborative testing: Evidence of learning in a controlled in-class study of undergraduate students.** *Journal of College Science Teaching*, 43(3), 83-91.

⁴C. Wieman, G. Rieger, & C. Heiner, Physics Exams that Promote Collaborative Learning, *The Physics Teacher*, 52, pp. 51-53 (2014).

www.cwsei.ubc.ca/SEI_research/files/Physics/Wieman-Rieger-Heiner_Two-Stage-Exam_PT2014.pdf

done during structured recitations. Doing this activity synchronously has the added benefit that students can be encouraged to offer presenters feedback and ask clarifying questions.

- If your class is large, this activity above could be done asynchronously by having students create videos using their cell phones or laptop cameras to post and share with the class.

For design-based classes:

- If work is collaborative/team-based - create project teams consisting of students in adjacent time-zones. If this is not possible, consider smaller teams - or individual projects.
- If the original intent of the pre-pandemic design project was to have students create physical prototypes, consider alternatives that may still allow students to develop some of the intended skills. For example, can students create reasonable prototypes out of low-cost everyday materials? If not, consider whether or not drawing and sketching (by hand or using software) the prototype or creating an analytical prototype can still help students meet some of the subject's goals (see the "2.007 Case Study" below).
- Make sure to provide clear criteria for a "successful" design.
- Consider substituting a series of case studies of different products on the market could substitute for some of the learning goals of the design project.
- Set up a schedule to check-in with students/student teams on a regular basis to answer questions and hear about their progress. TAs can assist with this.

For lab-based classes^{5 6 7}

- Consider whether or not certain goals of the traditional lab experience can be accomplished if students *observe* a lab experiment - and then answer questions, and/or perform calculations based on digitally distributed measurements/data. It may be possible to run the experiment and to collect the data under socially-distanced conditions in a lab at MIT before the semester begins, or to find data online. Two possible sources for virtual experiments are:
 - The [Journal of Visualized Experiments](#) which offers over 9,500 videos demonstrating experiments, mapped to key concepts and student protocols.
 - [MERLOT](#) which hosts info from ~100 virtual labs.

For small to medium classes:

- **Self-evaluations with or without student portfolios:** Students complete a self-evaluation in which they reflect on their work/progress towards course learning outcomes. This reflection exercise can be extremely beneficial for students because it encourages them to: 1) focus on learning rather than grades; 2) encourages metacognition - a lifelong learning skill; 3) allows you to individualize feedback.

⁵ For additional ideas, see [this recent guide](#) by Vanderbilt's CFT Associate Director Cynthia Brame

⁶ [Chronicle article](#) by Heather R. Taft

⁷ [Inside Higher Ed article](#) by John D. Loike and Marian Stoltz-Loike

- The self-evaluation can be accompanied by a selection of student work (quizzes, homeworks, etc) or portfolio (see [this example](#) of how to use student portfolios and self-reflections from Olin College).
- After students submit their reflections, a 1:1 meeting with you to discuss their progress and next steps is a nice complement even if this is done in the place of a final exam.
- If you choose this option, recognize that students may not be accustomed to such an exercise and will benefit from examples and structure.
- Some things that students can be asked to reflect on include: assignments completed; in-class activities and discussions; how they approach their work; how they interact with their peers; knowledge, skills and abilities that they feel that they have acquired in the subject; “lightbulb” moments when they have connected course content to other aspects of their lives (e.g., other subjects, day-to-day scenarios).
- **1:1 oral exam:**

Some MIT faculty already use oral exams to assess student learning (see examples [here](#) and [here](#)). This mode of assessment can be translated to a remote teaching and learning situation as oral exams can take place on a variety of platforms (e.g., Zoom, Webex, etc). You’ll want to carefully consider your departmental and subject culture before implementing an oral exam as an entirely new format may create anxiety for students.

 - Develop a set of well-structured questions and an interview protocol to assess a student’s level of understanding and facilitate a great dialogue. One approach is to map out the learning objectives that the exam is targeting: 1) arrange them from conceptually simple to conceptually complex; 2) indicate which objectives are prerequisite for other objectives; and 3) write questions that map onto these objectives. Now you have a map to follow during your oral exam.
 - Start with a simpler question, a question that you expect most students would be able to productively respond to, to put students at ease. If the student gets the question correct, ask a harder question. If the student doesn’t get the more difficult question correct, ask a simpler but related question. Use your map to adjust the questions to the student’s level. Treat the oral exam more as an intellectual discussion rather than a classical exam.
 - Reserve a couple of days on your calendar for the oral exams and allocate ~20 min per student. Use an online scheduling tool like Doodle to create time slots where students can sign up.
 - Even though the administration of oral exams for an entire class takes longer than the administration of a written exam - if you have created well-structured questions and a clear evaluation protocol, the “grading” of oral exams requires very little time.
- **Student presentation/demonstration:**

In place of an in-class exam, identify presentations or demonstrations students could do to demonstrate that they have met the intended learning outcomes.

 - Presentations or demonstrations have the added benefit of providing a more [authentic assessment](#) that encourages students to engage with messy, real-world scenarios.

- Students can do multiple takes if recording their presentations asynchronously.
- A presentation creates an opportunity for student-student interaction with peer review and feedback on presentations (see “Peer Teaching” above).
- Examples:
 - Presentation of a topic of individual student choosing - related to course content or selected from an instructor-curated list.
 - Digital poster session with peer feedback.
 - Musical composition, digital artwork, recording of a performance.
- **Project or essay:**
As with presentations/demonstrations, students can complete a project or essay in place of an exam to demonstrate achieving learning outcomes. Examples might include:
 - Writing a document common in your discipline (e.g., policy memo, artistic statement, grant application, excerpt from an academic article).
 - Annotated bibliography
 - Scientific or academic abstract
 - Analysis of a case study, data set, or data visualization
 - Draft of a fact sheet or Wikipedia entry for a general audience on a key topic of the course

For medium to large classes

The following strategy can also be used in small to medium classes for exams *during* the semester (however, it *cannot* be used during Finals Period).

Take home or open-book exams:

- Can lower the stress of final exams, especially during what already is a stressful time.
- Allows for higher-order-thinking questions that prompt students to analyze, evaluate and synthesize.
- Allows for open-ended questions.
- Make sure to check-in with your students to see how many of their classes are also planning to do a take home or open-book exam as they tend to take more time to complete.

Case Studies at MIT

3.016 | Mathematics for Materials Science and Engineers

Professor Craig Carter

Medium size class, materials science & engineering computational subject

Instead of a final exam, students will produce two videos:

- 1) A pedagogical demonstration and visualization about the physics for a problem of the student's choosing.
- 2) A video with a tutorial of how the student obtained the solution and how their code works. Each video must be less than 5 minutes.

To help with this new assessment scheme:

- Students have been provided with more time to brainstorm their projects.
- Instructional staff has provided more one-on-one interactions with students.

Professor Carter has also introduced a series of low-stakes assessments that he hopes motivates students: weekly physics/math/coding puzzles followed by a prize that students chose. Students receive a simple challenge (ex: find the average chord length of a circle). Students who participate then get a choice of prize (e.g., pizza with instructional staff and co-participants at Area Four, ice cream party at Toscaninis', chips and salsa party) to be given in the fall semester. "The last challenge was fun because two students got different answers and both were correct—an example of Bertrand's paradox. One student made a video of his solution to share," reflects Professor Carter.

2.086 | Numerical Computation for Mechanical Engineers

Professor Dan Frey

Large class, mechanical engineering computational subject

Professor Frey made the following modifications to this two summative assessments:

- Mid-term exam: a *file* will be posted on the course's site which will be available for download when the exam period starts. Two hours later, students have to post their solution which is the file provided plus their answers added within the file. Given that the exam is not proctored, Professor Frey asks students to sign the following code of conduct: "I, FIRST NAME LAST NAME, will not communicate during the exam period with any person by any means including voice, text, or file sharing. I will not post any solution materials where they are accessible to other students during the exam period and for one hour after the exam (10:30 PM tonight)." The reason for including the last part of the statement is because several students in the course have received special time accommodations.
- Final project: ~~Final project~~: the final project in the course is based on coding, therefore plans for its administration and distribution have mostly stayed the same. The following was communicated to the students regarding exceptions for working in teams: "The final project will proceed mostly unchanged. An exception is that the Project Scoping document which was due Monday 16 March is now due Monday 30 March. Also, if any student wishes to switch from a team project to an individual project (because team coordination will probably be more challenging now), then just submit an individual project proposal on 30 March. Project coaching will be accomplished using individually scheduled appointments using Zoom, Skype, Facetime or whatever each project coach chooses. The project showcase will be canceled and

only the written project reports will be required, but a virtual space for sharing these reports and for receiving comments from classmates will be arranged.”

2.007 | Design and Manufacturing I

Professor Sangbae Kim, Senior Lecturer Dawn Wendell, Professor Amos Winter + many coaches
Large class, mechanical engineering design and manufacturing subject

Typically, this subject includes a major design-and-build project where students design and build robots that they showcase in a final competition. The students are not able to build their robots in a remote learning situation, so the syllabus and assignments have been revised to focus more on design.

The final assessment will be a report detailing their design and analysis, and a presentation to their lab group about their final Robot design. “We know that this changes exactly the details of what students will leave the class knowing, but we are confident that they will still be generally well-versed in design and manufacturing,” reflects Dr. Wendell.

Innovations in Subjects Across MIT

See [Open Learning’s Residential Digital Innovations Site](#) for a description of the assignments and assessments used in 21M during the spring 2020 term.