

RECOMMENDATIONS FOR REMOTE MATHEMATICS INSTRUCTION

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This document outlines recommendations and best practices for offering our mathematics courses remotely during Spring 2020.

- I. General Recommendations
- II. Course Administration and Communication
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In the context of this document we use the adjective *synchronous* to describe forms of education, instruction, and learning that occur at the same time, but not in the same place.

I. General Recommendations.

- A. **Do not deliver course content exclusively through synchronous instruction.** You will likely need to accommodate illnesses, differences in time zones, and resource constraints in households that may be device- or space- or bandwidth-limited. Be flexible with discussion sections, office hours, and timed assessments.
- B. **Use Northwestern-supported software** to maximize the ease and availability of support and to minimize the proliferation of different applications across courses.
 1. Use **Canvas** as the main point of access to your course. Canvas is a learning management system.
 2. Use **Zoom** for synchronous communication with students. Zoom is a video conferencing platform with screen sharing and recording that integrates with Canvas.
 3. Use **Zoom** or **Panopto** to record (or pre-record) lectures. Panopto is a video recording and editing platform that integrates with Canvas.
 4. Use **Panopto** to edit videos and to post or embed videos in Canvas.
 5. Use **Crowdmark** to administer, collect, and score most assessments. Crowdmark is a collaborative online grading and analytics platform that integrates with Canvas.
 6. Use **Box** to share files with teaching assistants and other instructors. Box is a file sharing service.
 7. Use **Teams** to collaborate with teaching assistants and other instructors. Teams is a chat-based collaboration tool.

II. Course Administration and Communication.

- A. Use **Canvas** for course administration and communication.
 1. Get started.
 - a. Visit the [Canvas Learning Center](#).
 - b. Attend a [\[Virtual\] Introduction to Canvas](#).
 - c. Obtain a template Canvas site from [Aaron Peterson](#).
 2. Use Canvas Assignments for assessments.

Date: April 6, 2020.

- a. Enter the due date of each assignment, quiz, and examination so that each appears in students' calendars.
 - b. Organize Canvas Assignments by category, and input weights and grading policies (e.g. 'drop lowest score') for each category.
3. Use Canvas Announcements to communicate with your class.¹
 4. Use Canvas Discussions to facilitate responding to questions from students.
 5. If you create your own Canvas site, then
 - a. Provide a course syllabus that clearly and completely communicates learning objectives, course policies, and assessment instructions. Input the text of your syllabus directly into Canvas under the 'Syllabus' tab. You need not post a PDF of the course syllabus.
 - b. Link to remote learning support resources.
 - i. [Student Resources for Remote Learning](#) instructs students on how to participate in remote courses.
 - ii. [Remote Learning](#) has information specific to courses in the Department of Mathematics.
- B. Use **Zoom** for synchronous communication.
1. Get started.
 - a. Visit [Virtual Meetings - Zoom: Getting Started & Support Options](#).
 - b. Attend a [\[Virtual\] Introduction to Zoom for Instructors](#).
 - c. Participate in a [Zoom Practice Session with Student Employees](#) during Spring Break.
 - d. Enable Zoom in your Canvas site under "Settings→Navigation."
 2. Use **Canvas** to schedule Zoom meetings for lectures, discussion sections, and office hours. Select meeting options carefully. In the Zoom desktop client these options are available in the Settings or Preferences dialogue.
 - a. We recommend the following settings in Settings→Profile→View Advanced Features.
 - i. Under Meeting, set 'Only authenticated users can join meetings.'
 - ii. Under Recording, set 'Only authenticated users can view cloud recordings.' Note: This is not the default setting. You cannot change this setting from the Zoom tab on Canvas.
 - iii. See [Understanding Zoom Privacy and Security Settings](#).
 - b. We recommend scheduling one recurring meeting for lectures and discussion sections and another recurring meeting for office hours.
 - i. If you want class meetings and discussion sections to appear in students' Canvas calendars, then set a meeting time for the recurring meeting for class meetings and discussion sections. However, with this setting the meeting will not be available to take questions during evening midterm examinations or the final examination.
 - ii. If you want to use the same Zoom meeting for class meetings to take questions during evening midterm examinations or the final examination, then set the recurring Zoom meeting for class meetings and discussion sections to 'no fixed time'. However, with this setting class meetings and discussion sections will not appear in students' Canvas calendars.
 - iii. Set the recurring meeting for office hours to 'no fixed time' to accommodate different office hours on different days.
 - iv. Enable the Waiting Room for office hours.
 - v. Add your teaching assistants and back up instructor as alternative hosts.
 - c. Use Polling to obtain instant feedback from students.
 - d. Use Breakout Rooms to split students into small groups.

¹We do not recommend email or Canvas Conversations (Inbox) for communication with your entire class.

III. Content Delivery.

- A. Post pre-recorded or live video lectures.
 1. Pre-record lectures using Zoom or Panopto, or record live lectures using Zoom.
 - a. Get started.
 - i. Visit [Desktop Video Recording and Live Streaming](#).²
 - ii. Visit [Panopto & Video Recording](#).
 - iii. Visit [Panopto Support](#).
 - b. To record your voice, you will need a microphone.
 - c. To display written work, there are several options:
 - i. Use a document camera to display what you write in real time on paper.
 - ii. Use Beamer or PowerPoint slides.
 - iii. Use a virtual whiteboard or note-taking application to display what you write in real time using a tablet and stylus.³
 - iv. Use a camera to display what you write in real time on a physical whiteboard or blackboard.⁴
 - d. Experiment with several modes of presentation before choosing one for your course. Here are two recommended options.
 - i. Narrate and use screen sharing in Zoom with a document camera to display what you write in real time on paper.
 - ii. Narrate and use screen sharing in Zoom to display prepared Beamer or Power Point slides. Switch to a document camera, virtual whiteboard, or note-taking application to display what you write in real time.
 2. Upload Zoom and Panopto recordings to your Panopto folder.
 3. Use **Panopto** to edit video files. You can rename the video, make cuts, add a Table of Contents, add time-stamped comments, and insert slides or other images.
 4. Post a link to the video in Canvas which will play in a new window, or embed the video in Canvas.
- B. Post course notes or slides in addition to, or lieu of, a lecture recording.
 1. Prepare handwritten or L^AT_EX lecture notes. Scan handwritten notes to PDF. A L^AT_EX lecture notes template is available on the [Department intranet](#) under Teaching Resources. Accessing this template requires your Department user name and password.
 2. Post notes to Canvas by uploading them to Canvas Files and creating a link in Canvas.
- C. ‘Flip’ your class.
 1. Post video lectures and/or lecture notes several days in advance, perhaps with exercises.
 2. Use a synchronous lecture to ask and answer questions regarding material in the videos, notes, and exercises.
 3. Use **Canvas** or **Panopto** to administer short pre-lecture quizzes, and incorporate a ‘preparedness’ score in the course grade.

IV. Discussion Sections and Teaching Assistants.

- A. See [Resources for Teaching Assistants for Spring 2020](#).
- B. Allow your plan for the discussion sessions to evolve based on feedback from teaching assistants.
- C. Create an open and sustained line of communication with your teaching assistants.
 1. Reply quickly to messages from teaching assistants.

²This page contains information about integrating Panopto with BlueJeans. Integrating Panopto with Zoom is virtually identical. Zoom is replacing BlueJeans.

³Preliminary testing suggests that a powerful tablet and stylus (such as an iPad Pro with a 2nd Generation Apple Pencil) is necessary for this to be successful.

⁴Using a physical whiteboard or blackboard requires good lighting and a high-quality camera.

2. Communicate details of course material and expectations to teaching assistants well in advance. Consider scheduling a standing weekly meeting.
 3. Regularly discuss student progress with teaching assistants.
- D. Create a clear plan for how teaching assistants will assist with the course, and ensure that they are prepared to add as much value as possible. Here are a few options:
1. Teaching assistants hold synchronous meetings using Zoom during scheduled discussion section times.
 - a. Require teaching assistants to undergo Zoom training, and verify that they have all necessary technology to assist in the course.
 - b. Verify that teaching assistants have a robust method for sharing written work with their students (e.g. a camera, a sufficiently sophisticated tablet with stylus, etc.).
 - c. Discourage teaching assistants from lecturing in discussion sections.
 - d. Synchronous online discussions need not have the same format as traditional discussions. Here are a few recommended options:
 - i. Students send questions to teaching assistants before the scheduled discussion section time. Teaching assistants to answer these questions and to field new questions during the Zoom meeting. Teaching assistants to record these meetings.
 - ii. Teaching assistants use Breakout Rooms to facilitate ‘chat with your neighbors’-type discussions.
 2. Teaching assistants hold synchronous office hours using Zoom during the scheduled discussion section times, and moderate *asynchronous* discussions in Canvas Discussions.
 - a. For the asynchronous discussion, if your class has multiple discussion sections, then consider using the Groups feature to split your students by discussion section and create a Canvas discussion for each group.
 - b. Teaching assistants reply to questions on the discussion boards or in short videos.
 3. For larger classes with synchronous lectures over Zoom, consider inviting a teaching assistant to be a co-host during lectures to answer questions that students pose through Zoom’s chat feature. Consider such work to be part of the teaching assistant’s workload, and offer the teaching assistant relief from other duties.

V. Assessment.

- A. Use **Crowdmark** to administer and score timed examinations, take-home examinations, and written assignments. See [Remote Examinations](#) for instructions and best practices. Here are some ideas for remote timed examinations:
 1. Let students use books, notes, and the internet while taking the examination.
 2. Create questions that students cannot answer by copying from the textbook or notes, by performing an internet search, or by using an application such as Wolfram Alpha.
 3. Make the examination long, so that students do not have time to perform internet search or engage in extensive collaboration.
 4. Be ruthless about having students show their work.
- B. Use **Canvas** to administer multiple-choice quizzes.
- C. Use **Panopto** to embed quizzes in videos to assess engagement and participation.
- D. Use **Crowdmark** or **Canvas** to assign and collect projects.
- E. Use **Zoom** to conduct student presentations.
 1. Suggest that students narrate over slides.
 2. Provide students with a clear rubric describing how you will score the presentations.
 3. Record presentations for reference.

VI. Academic Support and Learning Advancement (ASLA).

- A. Drop-In Peer Tutoring for MATH 218-2, 218-3, 220-2, 226-0, 228-1, 228-2, 230-1, 230-2, 240-0, 250-0, and 290-3 will occur online during Spring 2020. See [Drop-In Peer Tutoring](#).
- B. Peer-Guided Study Groups for MATH 218-2, 218-3, 220-2, 228-1, and 230-1 will occur online during Spring 2020. See [Peer-Guided Study Groups](#).

VII. Managing Recordings. Ensure that only students in your course can access your recorded videos on Canvas and that no students can download your video. To do this:

- A. To share Zoom recordings through the Zoom tab in your Canvas site, see the settings in Section II.B.2.a.
- B. To share Zoom recordings through the Panopto tab in your Canvas site, enable Panopto in Canvas through Settings→Navigation. At the beginning of the course, prepare your Panopto folder: In the Panopto tab on Canvas, select your course from the drop-down menu. Click on the ‘Settings’ button to the right of this drop-down menu. Under the ‘Share’ tab, verify that the ‘Who has access:’ drop-down menu says ‘Specific people’, and that the only entries below the drop-down box are of the form ‘YOUR COURSE::Creator’ and ‘YOUR COURSE::Viewer. Under the ‘Settings’ tab, choose ‘No one’ from the ‘Download enabled’ drop-down menu. For each recording:
 - 1. Prepare the video for posting: After you record a video to the cloud through Zoom, the video will automatically appear in your ‘My Folder’ in Panopto. Locate this video in Panopto. Click on the ‘Settings’ button for that video. Under ‘Overview’, click on the ‘Edit’ link corresponding to the ‘Folder’, and navigate to ‘Canvas\YOURCOURSE using the drop-down menu. Then click the ‘Save’ link.
 - 2. Post the video: Copy the ‘Link’ at the top of the ‘Share’ tab and use this to post on your Canvas page. The video will open in a new window.
- C. **Do not share** links to your recordings publicly.
- D. Include the following language in your syllabi:

This class or portions of this class will be recorded by the instructor for educational purposes. These recordings will be shared only with students enrolled in the course and will be deleted at the end of the end of the Spring Quarter, 2020 course. Your instructor will communicate how you can access the recordings.

Unauthorized student recording of classroom or other academic activities (including advising sessions or office hours) is prohibited. Unauthorized recording is unethical and may also be a violation of University policy and state law. Students requesting the use of assistive technology as an accommodation should contact AccessibleNU. Unauthorized use of classroom recordings including distributing or posting them is also prohibited. Under the University’s Copyright Policy, faculty own the copyright to instructional materials including those resources created specifically for the purposes of instruction, such as syllabi, lectures and lecture notes, and presentations. Students cannot copy, reproduce, display or distribute these materials. Students who engage in unauthorized recording, unauthorized use of a recording or unauthorized distribution of instructional materials will be referred to the appropriate University office for follow-up.

VIII. Resources.

- A. [Guidance for Remote Teaching](#)
- B. [\[Virtual\] Adapting Quickly to Teaching Remotely](#)
- C. [Resources for Teaching, Learning, and Working Remotely](#)
- D. [Hardware Recommendations](#)
- E. [45-minute consultation with Northwestern IT](#)

Teaching Remotely Readiness Checklist

This guide will help you gather the materials necessary to begin teaching remotely in Canvas. This guide assumes that you teach face-to-face and you are not familiar with Canvas. This guide is meant to be used in conjunction with the [Facilitating Classes Remotely guide](#) provided by Northwestern IT Teaching & Learning Technologies.

1. Preparation.

- ✓ Sign up for and attend workshops in your school or with Northwestern IT on Canvas for teaching remotely.
- ✓ Sign up for and attend a workshop in your school or with Northwestern IT on Zoom for teaching remotely.
- ✓ Run a test session in Zoom.

2. Review your syllabus.

- ✓ Be sure to include information about how you plan to meet your class: will it be synchronously, via web conferencing, or will you be recording much of your content and presenting it asynchronously?
- ✓ Include your expectations about student attendance.
- ✓ Consider how you will be meeting students in office hours and add that information in the syllabus.
- ✓ Think through your plan for the first three weeks of the term: what content will the class be learning? Will that differ in an online format?
- ✓ Put your syllabus into a Word document. If possible, use headers to organize the sections of your document.

3. Locate your NetID and password.

- ✓ If you do not remember your NetID password, follow the [NetID Password Reset Guidelines](#).
- ✓ If you are still having trouble, you can contact consultant@northwestern.edu for help.

4. Log in to Canvas.

- ✓ Using your NetID and password, log in to Canvas at canvas.northwestern.edu

5. Find the Canvas site for your course.

- ✓ Your Canvas course site should appear in your Canvas Dashboard. [How do I use the Dashboard as an instructor?](#)
- ✓ If it does not appear in your Dashboard, check for your course on your Course List. Click *Courses* in the left navigation and then *All Courses* in the menu that pops out. [How do I use my course list as an instructor?](#)
- ✓ Check student enrollment in Canvas. Click on *People* in the course navigation. This will help confirm that you are in the correct course site. [How do I use the People page in Canvas as an instructor?](#)

6. Load your syllabus.

- ✓ At a minimum, provide your students with the course syllabus. Here's how:
 - Click *Syllabus* in the left navigation.

- Click *Edit* in the upper right.
- Either copy and paste the text of your syllabus into the box and click *Update Syllabus* OR Type “Here is the syllabus” in the box, highlight the text, click *Files* on the right, then *Upload a new file*, and upload your syllabus document. Then click *Update Syllabus*.

7. Publish the course and syllabus so that students can see them.

- ✓ You must publish a course before students can access it and its contents. Students cannot see unpublished courses and content. [How do I publish a course?](#)

Note: Students will be able to see changing components in the course site as you build them.

8. Communicate how to find the syllabus to your students.

- ✓ You can use the *Announcements* feature to send a message to all of your students. If you are drafting a message, assign it a date. Otherwise, it will be sent immediately. [How do I add an announcement in a course?](#)

Note: Announcements will not be sent to students unless the course is published.

If you need more help along these lines, please see the [Canvas Learning Center](#).

You may also [sign up for a 45 minute consultation](#) to get help with moving to remote instruction.

Accessibility Recommendations for Remote Teaching

Developing Accessible Canvas Courses

For in-depth information about creating an accessible course in Canvas, check out this [tip sheet](#) or the [How Do I Make a Course Accessible?](#) site from Northwestern's School of Professional Studies. Below are some basic accessibility issues that should be addressed in each course.

Accessible Documents

Documents provided on Canvas need to be accessible to students with disabilities. For documents created using the Microsoft Office Suite, the [built-in accessibility checkers](#) will provide feedback on errors and guidance on how to fix them.

Scanned PDFs are not necessarily accessible. At minimum, run [Optical Character Recognition](#) on scanned documents to make the text readable. Use the [Adobe Accessibility Checker](#) to address other accessibility issues. If possible, [contact the library](#) to find a digital version of the scan.

Text Equivalents for Audio and Video

For any recordings, either audio or video, you must provide a text equivalent. For audio, this is a transcript; for video, captions. The best way to create a text equivalent is to write a script and record from that. However, if that is not an option, you can use auto-generated captioning tools like [YouTube](#) or [otter.ai](#) to generate a transcript or caption file. You will need to edit the file to be accurate; auto-generated transcripts are typically only about 60%-70% accurate, which is unacceptable for students.

Holding a live video meeting

Make a text announcement in advance of a live video call informing students about the live meeting, so that students with a live captioning accommodation through [AccessibleNU](#) have adequate time to get this set up for the meeting.

Text Equivalents for Images

Any images included in the course site must have a text description. In documents, the accessibility checker will advise on how to add a text description. In Canvas, the image uploader has a field for "alt text," which is where you can add a brief description of the image, which should include the important information that the image is conveying.

Zoom Readiness Checklist

Use this guide to review key steps to be prepared to videoconference with either a large or small group.

1. Go to northwestern.zoom.us and select **Log in** to create an account
2. [Download the Zoom client](#)
 - a. When logging into the Zoom client, click “**Login with SSO**”
 - b. Enter Northwestern
 - c. Login with your NetID and Password
3. Scheduling Zoom meetings
 - a. For class meetings, use the **Zoom menu in Canvas**, then:
 - i. Select “Schedule a New Meeting” within the Zoom menu
 - ii. You can schedule individual sessions or recurring sessions that will display for students automatically on the Syllabus and Canvas calendar pages
 - iii. We recommend setting automatic recording in case students are unable to attend
 - b. For other zoom meetings (peer to peer, department meeting, etc.) use the [Zoom website or app to schedule](#)
 - c. If you are not using BlueJeans, hide the BlueJeans link in the navigation for your course by [customizing your course navigation menu](#).
4. Participate in, and then host, live Zoom test session(s) [before classes start](#).
 - a. Decide whether you will use audio built-in to your computer, audio from a headset or other source, or a telephone
 - i. As a participant, telephone can suffice for audio, but as a host, likely you will need to select a different audio source
 - b. [Test the video capabilities of your device](#)
 - c. [Practice promoting/demoting hosts](#)
 - d. Practice [managing participants](#):
 - i. Mute/unmute
 - [Mute on join / Mute all](#)
 - ii. [Screen sharing](#)
 - iii. [Chat window](#)
 - iv. [Hand raising, thumbs up, thumbs down, etc. \(non-verbal cues\)](#)
 - e. Practice Whiteboarding (Under screen sharing)
 - f. Practice [Breakout rooms](#)
 - g. Practice [Polling](#)

Optional

- Install the [Outlook plug-in for Zoom](#)
- Details on [settings for Zoom meetings that are sensitive](#) in nature

Remote Teaching: Handwriting Options for Video-based Instruction

Handwritten Work

The issue of how to show handwritten work in a video conference or recorded lecture is an important consideration, especially for subject matter that emphasizes the derivation of certain conclusions via a set of iterative steps.

In Zoom, three different practical options for showing handwritten work

1. Attach a USB document camera to the computer, point the camera at a document, select the camera from Zoom, begin handwriting on the document
 - (A) All-in one integrated USB document camera
 - (B) Ad-hoc use of USB webcam not specifically designed for document camera use
 - (C) Ad-hoc document camera using cellphone, with added software
2. Use a drawing tablet together with a computer to:
 - (D) Draw in Zoom's built-in whiteboard feature
 - (E) Draw in a paint or drawing program
 - (F) Draw on top of Microsoft PowerPoint presentations using the "Pen" feature
3. Use an iPad or Android Tablet device, together with a stylus
 - (G) Draw in Zoom's built-in whiteboard feature

Notes on Specific Configurations

(1.A) Examples of all-in one integrated USB document camera

- Longjoy LV-1 Series LV-1020
<https://www.amazon.com/B01N9VY25B/>
- IPEVO VZ-R HDMI/USB Dual Mode 8MP Document Camera
<https://www.amazon.com/Ipevo-5-883-4-01-00-VZ-R-Document-Camera/dp/B0784RZNKT>

Example use with Zoom: <https://www.youtube.com/watch?v=NIYqvMp1Dbs>

- Elmo OX-1 (lower resolution than above)
<https://www.cdw.com/product/elmo-ox-1-document-camera/5966625>

(1.B) Examples of using supplemental webcam not specifically designed as document camera

Theory of operation: find a way to mount a small webcam above a document in a downward-facing direction, as discussed and shown in the following image:

<https://www.yawcam.com/forum/download/file.php?id=46>

Zoran Ilic from Northwestern IT recommends Logitech webcams, in general, though does not have a recommendation specifically for this purpose:

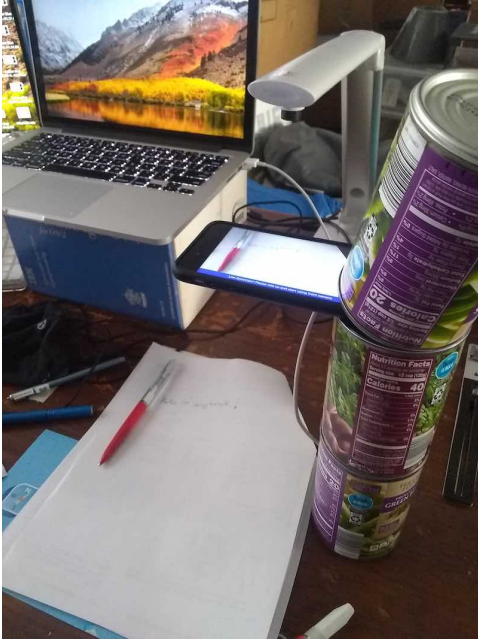
Standard web cameras:

- Logitech C920 (\$80)
- Logitech B525 (\$65)
- Logitech C930e (\$130)
- Logitech C925e (\$100)

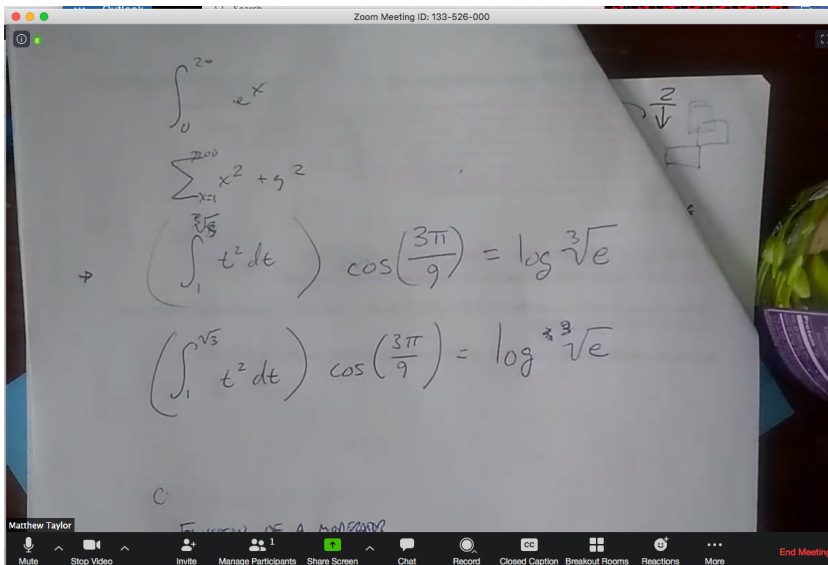
(1.C) Examples use of smartphone as impromptu webcam

A smartphone, equipped with an application (approx \$8) to enable its camera to be used as an additional web camera connected to a computer, used with Zoom. This is what the author has done at home.

- [EpocCam Pro](#) (iPhone/iPad) + EpocCam Drivers (Computer) + USB cable



- [EpicCam Pro](#) (Android) + EpicCam Drivers (Computer) + WiFi (both devices must be connected to the same WiFi network)



(2.D,E,F) Example drawing tablets compatible

Anything from the Wacom Intuos or Intuos Pro line is recommended, e.g.:

- [Wacom Intuos Creative Pen Medium](#) (\$200)
- [Wacom Intuos Pro Small](#) (\$250)
- [Wacom Intuos Pro Medium](#) (\$350)

(2.E) Example PC/Mac Software for drawing/writing with attached USB Drawing Tablet

Each of these apps support drawing on some kind of canvas using either the mouse, or a drawing tablet. These applications, once launched, can be screen-shared via Zoom.

- [Microsoft OneNote](#) — included with Northwestern’s Microsoft License; Supports typing text and drawing text and illustrations on a single note; Notes can be saved and organized in notebooks synchronized across multiple computers (and available online) via your Northwestern Microsoft account
 - Web version of OneNote also permits converting math notation to Math notation
- [Autodesk Sketchbook](#) — full featured drawing program, free for academic use; does not use “notebook” metaphor of Microsoft OneNote
- [Xournal++](#) — open-source handwriting, note-taking software. Lots of useful features, but recommended only for the computer-savvy power-user to install and use.
- [AWW board](#) — web-based whiteboarding software, offers large canvas that can be zoomed in and out

Example guidance from another institution: <https://www.math.uh.edu/~dave/help/tablets/>

(3.G) Example Hardware Configurations for Tablet Computers with Zoom

- Any Zoom-Compatible (Android, iOS) Tablet + 3rd Party Stylus (medium-precision)
 - [Targus Stylus](#) (\$9)
 - [Amazon Basics Stylus](#) (\$8)
- New **Apple iOS Devices** with Finer-precision Pens:
 - Any current iPad + 1st Generation Apple Pencil
 - [Apple iPad 10.2 inch](#) (\$330+)
 - [Apple Pencil 1st Generation](#) (\$99)
 - Any current iPad Pro + 2nd Generation Apple Pencil
 - [iPad Pro](#) (\$800+)
 - [Apple Pencil 2nd Generation](#) (\$130)
- New **Android Devices** with Finer-Precision Pens:
 - [Samsung Galaxy Tab S4 With S-Pen](#) (\$600)
 - [Samsung Galaxy Tab 10.1 inch with S-Pen](#) (\$380)

- [Samsung Galaxy Note Pro 12.2 with S-Pen](#) (\$350)

How to Use Your Cell Phone as a Document Camera in Zoom

1. Before being able to use your cell phone as a document camera, you will need to download the free “ZOOM Cloud Meetings” app.
2. After initiating your Zoom session on a computer, you can log into the session using your cell phone by opening the Zoom app and entering the appropriate meeting ID. It is important that the audio on your cell-phone is disconnected to avoid feedback issues. The best way to do this is by selecting the option to not “join audio” before joining the call. If the call was already joined, you can also disconnect the audio by selecting “more” and then selecting “disconnect audio.”
3. To begin sharing your cell phone’s screen, select “share content” and “screen.” Next, select “start broadcast” with Zoom and exit the Zoom app.
4. At this point, the home screen of your cell phone should be shared with your meeting members. To use your cell phone as a makeshift document camera, select the camera app. Open up the photo mode and aim the camera at whatever materials you would like to share with your students.

Notes:

1. It may be useful to prop your phone against something as you show yourself working out problems or writing so that the video connection is more stable.
2. If the screen sharing function on your cell-phone crashes, the app will suggest that you restart your device. If it is possible to do so without disrupting your session, restarting your cell phone and rejoining the Zoom meeting may help with troubleshooting technical difficulties.

