Online Teaching Committee Guidelines for Supervisions in Parts IA, IB and II Easter Term 2020

Last updated: 30th April 2020

This document offers guidance and advice to help supervisors and Directors of Studies meet the challenge of moving undergraduate supervisions online. It is neither finished nor polished; instead we expect it to be revised and updated in the days and weeks ahead, in response to comments and practical experience. Please send any feedback to undergrad-director@maths.cam.ac.uk .

The Faculty is acutely conscious of the additional commitment that the switch to remote teaching will require at an already stressful time, and is grateful to all supervisors and Directors of Studies for stepping up to the challenge.

In order to navigate this new environment, there are some key principles that should be maintained.

Guiding Principles and Expectations

- We must continue to teach and educate our students as effectively as we can. **We should aim to provide an academic environment that is as normal as possible**, to offer the greatest reassurance to students in these highly abnormal times.
- All students will be expected to sit exams in May/June, personal circumstances permitting. The immediate outcomes will be different this year, with no overall results for IA or IB and a pass/fail result for Part II. Nevertheless, **it is essential that students prepare as thoroughly as possible**, to consolidate what they have learned and to ensure they are well prepared for next year (whether that is Part IB, Part II or Part III).
- The format of the exam papers will also be unusual in certain respects (two papers instead of four and only short questions in Part II). However, **it is not anticipated that students should revise any differently than they would do in normal circumstances**.
- **Supervisions should follow the usual pattern as closely as possible**: students should submit work in advance; supervisors should scrutinise it in order to provide individual feedback; and there should be opportunity for interaction and discussion in the supervision itself.
- **In particular** supervisors should not simply provide students with solutions to past exam questions as a substitute for supervisions, or replace supervision with pre-recorded material only. (We remind supervisors that the model solutions provided by the Faculty must not be shared with students.)
- We expect that the **usual number** of revision supervisions should be provided for students sitting the May/June exams. (It is not yet clear what support would be appropriate for students who have to sit exams later in the year, instead of those offered in May/June.)

In contrast to these familiar features, there will inevitably be some major differences.

Very importantly, Directors of Studies are strongly advised to (i) contact supervisors to check their availability in Easter Term; (ii) collect information about the time zones in which both students and supervisors are located; (iii) enquire about other access issues (broadband, personal circumstances) that might prevent students from participating in supervisions. Clearly, such information will need to be taken into account when arranging supervision pairings, and the location of students might need to be relayed to supervisors in order for them to find times that are reasonable both for them and for their students.

Methods for conducting supervisions online are suggested below, but the list of options is certainly not exhaustive, nor should any particular solution be considered mandatory. Whatever method is adopted, students will appreciate the additional thought and preparation that adapting to these circumstances at short notice entails, and we hope they will understand that things may not always go exactly to plan.

Supervisors are encouraged to make the most effective use of the technological tools that are available to them to facilitate supervisions. For example, this may include the use of tablet computers and/or multiple cameras (laptop, phone, etc). However, due to long delivery times and, hopefully, only a short period during which supervisions need to be conducted this way, we do not encourage the purchase of expensive technology just for this purpose.

1) Preparing and submitting work

Scanning of work

(This will also be useful for supervisors who wish to scan handwritten notes and comments.) Students can write out their solutions as usual on paper, and then scan or photograph them. We recommend that you ask your students to submit their work *in form of a single PDF file*. Please note that it is significantly harder to mark multiple image files than a single PDF.

- Unless you have access to a scanner which can scan several pages as a batch, handwritten notes are most conveniently scanned using a smartphone. Several apps for this purpose are available free of charge. These include CamScanner and Adobe Scan, which are the two apps we will [most likely] recommend to students. They are suitable for both iOS and Android devices and allow scanning multiple pages with a mobile phone and then converting them into a single-file in PDF format. CamScanner (see www.camscanner.com) allows free access to its Premium version provided you create an account with your CRSid@cam.ac.uk email address (but please do not re-use any of your University passwords).

- If you own an iPhone, you may instead wish to follow the instructions provided at https://support.apple.com/en-us/HT210336. See also https://acrobat.adobe.com/us/en/mobile/scanner-app.html. There is information how to use it available at https://www.cnet.com/how-to/turn-your-phone-into-a-document-scanner-with-adobe-scan/
- If you own an Android phone, you may instead wish to use the Google Drive App as explained at https://support.google.com/drive/answer/3145835?co=GENIE.Platform%3DAndroid&hl=en.
- You may of course have access to a scanner connected to your computer. Alternatively, you may convert image files obtained using your phone or camera to PDFs on your computer. Many image processing applications have an 'export as…' button, for which 'PDF' subsequently appears as an option.

You might want to ask your students to ensure good lighting conditions to optimise legibility.

Submission of work, including new moodle site

Many supervisors would prefer not to receive supervision work via email due to the large size of attachments. To avoid this, students can share their work with supervisors by uploading it to a designated depository.

The Faculty has developed a moodle site called "Mathematics Supervisions" that can be used for the submission and retrieval of supervision work

https://www.vle.cam.ac.uk/course/view.php?id=182841

All undergraduate students (Parts IA, IB and II) are already enrolled as "participants" (it will be visible on their moodle dashboards) but supervisors must register to gain access. Each supervisor who registers will be given a "section" on the site and "assignments" corresponding to the lecture courses they are supervising. Students can then upload work for a particular supervisor and subject without the work of other students being visible to them.

In order to register to use the site, supervisors should e-mail:

supervisor-moodle@maths.cam.ac.uk

and give (i) their name, as it should appear to students, e.g. Dr Jonathan Evans; (ii) the lecture courses being supervised, with Tripos Part first, e.g. IA Vector Calculus or IB Quantum Mechanics (note the format and IA not 1A, etc). Supervisors should NOT send details of the students they expect to teach.

Alternative depositories for supervision work are e.g. shared DropBox folder or shared folder on your Google Drive (which can be accessed at http://drive.google.com with your

CRSid@cam.ac.uk and your Raven password). Please note that you should use the University-based G Suite@Cambridge service (see https://help.uis.cam.ac.uk/service/storage/google-drive) for this purpose rather than a personal Google account.

2) Marking of work

In the current circumstances, the careful and detailed marking of submitted work is just as important as ever. However, marking is likely to be more time consuming in this new setting and some supervisors may find it difficult to mark everything. It will be important to find constructive ways to strike the right balance in terms of essential marking within time constraints, as well as managing students' expectations in this regard.

Printing is costly and it is inefficient to rescan printed work to return to the students. Therefore, you might prefer to add your comments digitally. This can be done in a straightforward manner in most modern PDF viewers that support annotations. For instance, in the case of the Adobe Acrobat Viewer, there is a guide on how to do so available at https://helpx.adobe.com/acrobat/using/commenting-pdfs.html.

Please note that you might need to update your software in order to access its full functionality. You should also ask your students to use the same software to open and edit PDF files to ensure full compatibility. The Adobe Acrobat Viewer is available for download at https://acrobat.adobe.com/uk/en/acrobat/pdf-reader.html.

If you are using the new Mathematics Supervisions moodle site https://www.vle.cam.ac.uk/course/view.php?id=182841 to receive work (see above, including how to register) you will also find instructions there on how to mark and return work to students.

It can be useful to use LaTeX syntax to convey mathematical symbols in written text. While there are probably few cases in which the syntax of your annotations is not self-explanatory, you might want to explain to students how you use it.

3) Conducting supervisions

Most likely various sorts of video conferencing software have already become familiar to you. We **strongly recommend** that you experiment with possible setups in advance to minimise any additional disruption to teaching due to technical difficulties. You might want to try your setup in a test call with colleagues (see below).

Choice of platform:

- There are several platforms available that support real-time content sharing, including Zoom, Google Meet, MS Teams, and Skype. While it appears that Zoom is the most stable and user-friendly of the platforms listed, and most suitable for the context of supervisions, the choice of platform is ultimately yours and will depend on

your individual preferences and equipment. Both MS Teams and Google Meet are supported by the University.

- The best way to establish your preferences is to try out the different platforms. Several colleagues have kindly agreed to offer trial sessions (see Section 4).
- Free Zoom licences only cover sessions lasting up to 40 minutes but there is also the option to upgrade an account to allow for unlimited meeting time (this can be done on a monthly basis and the cost is modest). Tutorials and advice on Zoom specifically for educators are available at https://zoom.us/docs/en-us/covid19.html.
- When using Zoom, it is recommended that you do **not** give out your personal meeting ID to students but instead create a new meeting for each supervision, ideally with a password. This is done by clicking on the button consisting of a plus symbol inside a small square in the Zoom app. Clicking on 'Copy invitation' will copy all the information students need to access your supervision to your clipboard, from where it can easily be pasted into an email.
- The University has issued guidance on how to use Zoom securely: https://help.uis.cam.ac.uk/service/security/wfh-security/zoom-security
- In order to use Google Meet, it is recommended that you log in to Google at https://meet.google.com/ using your CRSid@cam.ac.uk email address and your Raven password. Instructions for how to start and run meetings can be found at https://support.google.com/meet/?hl=en#topic=7306097.
- The quickest way to install MS Teams is to visit https://teams.microsoft.com. You will automatically be prompted to download the right app for your device (and may be given the option to continue using the web app depending on your browser). You log in to Teams using your CRSid@cam.ac.uk email address and your University Active Directory password (which may be the same as your Raven password). Instructions for how to use Teams are available at https://universityofcambridgecloud.sharepoint.com/sites/MicrosoftTeamsHub/SitePages/Meetings-in-Teams.aspx.
- With any conferencing system, it is usually advisable to use earphones to avoid echoing feedback.

Possible set-ups for sharing content with students in real-time:

- Option 1. If you have a tablet, you can write on it and share its screen with the platform and your students in real time.
- Option 2. If you have a smartphone, you can film your hand as you write on a piece of paper and share the output in real time via one of the above platforms ('virtual visualiser').
- Option 3. If you are willing to prepare slides in advance (handwritten and scanned, or LaTeXed), you can share these in real time via one of the above platforms and talk students through them ('virtual presenting').

- Option 4. If you have a camera connected to a laptop/PC and a blackboard/whiteboard/flip chart at your disposal, you could film yourself writing on it and share the output in real time via one of the above platforms ('virtual lecturing')
- Option 5. You could share pre-prepared slides (either handwritten and scanned, or LaTeXed) with your students via email or Moodle in advance of the supervision and simply talk through them during the supervision.
- Option 6. You could write (in LyX, say) or compile (in your preferred LaTeX editor) content in real time while sharing your screen and delivering verbal commentary.

Option 6 is clearly demanding and relatively labour-intensive. Option 5 will feel less interactive than the others, but might be the easiest option if you are most comfortable on Skype. With Option 4 the main concern is insufficient quality of the transmitted image due to lack of resolution of the camera, and poor lighting.

Options 1-3 are recommended, if available to you. Further details on options 1-4 are provided below.

<u>Option 1:</u>

- The easiest way to use your tablet in this set-up (which works across all operating systems) is to simply join your conference call from your tablet, in addition to hosting it on your computer. From your tablet, you then need to share your device (by clicking on 'Share Screen' in Zoom, or 'Present' in Google Meet, for example) for your tablet's screen to appear to other participants in the call. You may have to install an app on your tablet corresponding to the platform you have chosen.
- Zoom's 'spotlighting' feature helps to ensure that your tablet's screen remains the main focus of the call at all times (otherwise the meeting's focus may switch to the person speaking).
- If you have an iPad and plan to use Zoom, you can share your iPad's screen directly via AirPlay (click 'Share Screen', iPhone/iPad via AirPlay).
- It is recommended that you mute any audio on your tablet during the call.
- You will want to ensure your tablet is fully charged or connected to power.
- Important note: if you use screen sharing then it is advisable to switch off notifications in case private messages appear.

<u>Option 2:</u>

- The easiest way to use your smartphone in this set-up (which works across all operating systems) is to simply join your conference call from your phone, in addition to hosting it on your computer. From your phone, you will then need to share your device (by clicking on 'Share Screen' in Zoom or 'Present' in Google Meet, for example) for your phone's video to appear on the screen of the other

participants in the call. You may have to install an app on your phone corresponding to the platform you have chosen.

- Zoom's 'spotlighting' feature helps to ensure that your phone's video remains the main focus of the call at all times (otherwise the meeting's focus may switch to the person speaking).
- If you have an iPhone and plan to use Zoom, you can share your phone's video directly via AirPlay (click 'Share Screen', iPhone/iPad via AirPlay).
- It is recommended that you mute any audio on your phone during the call.
- If you intend to use your phone in this way for a longer period of time, it pays to fix it at a suitable height above your desk. For example, placing your phone onto a piece of cardboard protruding beyond the edge of a (vertically placed) lever-arch file, with a book as a counterweight, seems to achieve a satisfactory outcome. Other creative solutions may be found by googling 'using your phone as a document camera'. See this creative *"Lego" solution* as an example.
- You might also want to connect your phone to power.

Option 3:

- You will need to prepare a PDF in advance, either by writing on paper and scanning your notes (see below), or using your preferred LaTeX editor.
- Landscape format lends itself better to sharing on screens, so you may wish to consider producing slides in Beamer (https://ctan.org/pkg/beamer?lang=en). Beamer also has the advantage of allowing 'overlays', meaning you can reveal content one line at a time.
- When your PDF file is ready, simply open it in your preferred PDF viewer. Once in your conference call, share your screen (by clicking on 'Share Screen' in Zoom or 'Present' in Google Meet, for example), and ensure that your PDF viewer is the main (ideally the only!) window in sight. Now scroll/click through your slides as you speak.
- Note that unlike Skype, many of the other platforms allow you to share specific application windows only, which can help avoid accidental 'over-sharing' of personal information (such as your inbox) during the call.

Option 4:

- If you possess only a laptop camera then the only option will be to hand-draw on a sheet of paper and hold it up to the camera. Laptop webcams have a significantly lower resolution than most phone cameras, so they are not suitable for scanning. Therefore, taking a screenshot is the only method for your students to preserve your sketch for their notes, and you should remind them to do so. You may find it helpful to look at your own image on the screen to ensure that the sketch is positioned correctly in the webcam's field of view.

- There is also the option to purchase a dedicated document camera at a reasonable price, e.g. at (https://www.amazon.co.uk/HUE-HD-camera-Windows-Black/dp/B00U7LV3UI). For instructions on how to select the document camera in Zoom, please see here (https://support.zoom.us/hc/en-us/articles/201362313-How-Do-I-Test-My-Video-) and for Google Hangouts see here (https://support.google.com/meet/answer/9302964?co=GENIE.Platform%3DDesktop&hl=en).

General comments

A few things should be borne in mind regarding accessibility: generally, due to transmission noise you should expect the quality of your camera recording to be worse on your students' screen than on your own. Therefore, it is essential that you write as large and as legibly as possible. In addition, it easy to underestimate the time that students need to read and think about what you have drawn, so please do not remove sketches from the field of view before your students have signalled that they understood them.

In rare cases students may not have access to a broadband internet connection and may not be able to see you. If this is the case and sketches are an essential part of your teaching, then you should ensure that they are not at a significant disadvantage e.g. by emailing them a PDF after the supervision.

Finally, we recommend that supervisors anticipate potential technical difficulties and include a bit of buffer time in their supervision schedule. While it is expected that students acknowledge the difficulty of the situation, they will appreciate everything you can do to conduct your teaching as smoothly as possible.

4) Further guidance and support

Technical help:
Suggestions and advice on how to deal with particular problems can be sought by e-mailing

supervisor-tech-help@maths.cam.ac.uk

Messages sent to this address will be passed on to a volunteer group of supervisors who have agreed to field questions based on their own experiences using a range of different approaches. This service relies on good will and is offered on a best-effort basis.

University Guidance on Remote Supervisions:
The Cambridge Centre for Teaching and Learning has put together some guidance for online supervisions at https://www.cctl.cam.ac.uk/files/cctl_moving_supervisions_online.pdf

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Feedback:
This document was put together in a very short space of time and will be updated over the coming weeks in light of colleagues' comments and experience. Please send feedback to undergrad-director@maths.cam.ac.uk .