

## ACSE-8: Machine Learning

### Introduction

This document provides an overview of ACSE-8. Students should read these guidelines carefully as they cover details about remote teaching, coursework and the final time-limited remote assessment, which has replaced the exam.

### Teaching staff

**Module coordinator:** Prof Olivier Dubrule

**Teaching assistant:** Navjot Kukreja

**Graduate teaching assistants:** Deborah Pelacani-Cruz, Mingrui Zhang, Harriet Dawson, Andrea Gayon Lombardo and Zainab Titus.

### Remote teaching

Microsoft Teams is being used for all remote teaching. We recommend that you install the Teams app both on your personal computer/laptop and smartphone. You have all been added to the ACSE19 Team. You are expected to check for module updates on Teams in addition to email. If it is not possible for you to use Teams for whatever reason then you must contact the course director, Dr Gerard Gorman, immediately.

All online teaching will proceed as previously scheduled. You should have received calendar invites for all teaching sessions – you can always go into the Calendar view in Teams to join the session. When you connect to the lecture, **please do not click the Record button**. You should mute your microphone and keep it **muted throughout the entire lecture**. You should post any comments/questions using the Teams chat where the teaching assistants (TA's) will assist you (as they have assisted you on slack up until now). During each lecture one of the teaching team will also act as moderator and interject when appropriate so that the lecturer can address popular questions on the chat. All academic questions should be posted on the class channel so that the whole class can benefit from seeing the question and answer.

While all lectures will be recorded, **you are expected to attend the online lectures and exercise sessions**. These sessions are the only times that TA's have been booked to support you online. Support outside these times will be limited as the staff and grad students involved also have other commitments.

### Teaching schedule

ACSE-8 is structured around six main topics, and each topic will be covered by a two-day session. Each two-day session has four parts, which are organised as follows:

1. Theory lecture. Presenter: Olivier Dubrule. Moderator: Navjot Kukreja.
2. Guided Theory Exercise Session
3. Implementation lecture: Presenter: Navjot Kukreja. Moderator: Olivier Dubrule.
4. Guided Implementation Exercise Session

It is your responsibility to check your Imperial College Outlook/Teams calendar for the exact schedule and any updates, ensuring that you have taken into account your local time zone. Because we have students spread across the globe we are unable to shift the timetable without disadvantaging students either east or west of BST.

As originally planned, no lectures are planned for the Wednesday 6 May and Wednesday 13 May. However, a lecture on Wednesday 29 April is necessary to compensate for the fact that Friday 8 May is a UK bank holiday.

### Learning resources

The documents relating to the theory lectures (copies of slides, exercises, etc...), except those related to the coursework and exam (see below) will be communicated to the students via Box. The material for the implementation lectures will be in the form of Jupyter Notebooks at <https://github.com/acse-2019/ACSE-8>

To help prepare for the start of lectures we recommend you study these four 15 minutes videos which provide a good introduction to Machine Learning:

[https://www.youtube.com/watch?v=aircAruvnKk&list=PLZHQObOWTQDNU6R1\\_67000Dx\\_ZCJB-3pi](https://www.youtube.com/watch?v=aircAruvnKk&list=PLZHQObOWTQDNU6R1_67000Dx_ZCJB-3pi)

### Assessment

In this module, there will be two coursework assessments and one time-limited remote assessment (ACSE-8.3 in the table below).

Assessment	Scheduled Time for Release	Deadline	Percentage of module grade
ACSE-8.1 (coursework)	5th May	11th May	25%
ACSE-8.2 (coursework)	12th May	18th May	25%
ACSE-8.3	13:00 BST, 29th May	15:00 BST, 29th May + an additional 30 minutes to scan and upload assessment.	50%

All coursework submissions are managed through GitHub Classroom as usual. In the event that you miss an assessment deadline due to technology failure, you should email your assessment to [y.ashton@imperial.ac.uk](mailto:y.ashton@imperial.ac.uk) along with a description of the failure at the first available opportunity. The ACSE-8.3 time-limited remote assessment will also be submitted via GitHub Classroom. Further details on the ACSE-8.3 assessment, the submission process and what to do if things go wrong are given in the next section.

## **IMPORTANT: Student guidelines for ACSE-8.3 (time-limited remote assessment)**

In line with College guidelines on remote assessment during the COVID-19 lockdown, assessment ACSE-8.3 will be an **open-book, time-limited remote assessment that replaces the usual two-hour exam**. The same format and examination rubric as last year's exam will be used to minimize disruption to the students. Therefore, as part of your preparation for the exam, we recommend you look at last year's exam paper.

Please carefully read the following College statement that pertains to the ACSE 8.3 open-book exam:

*"This time-limited remote assessment is being run as an open-book examination. We have worked hard to create an exam that assesses synthesis of knowledge rather than factual recall. Thus, access to the internet, notes or other sources of factual information in the time provided will not be helpful and may well limit your time to successfully synthesise the answers required.*

*Where individual questions rely more on factual recall and may, therefore, be less discriminatory in an open book context, we may compare the performance on these questions to similar style questions in previous years and we may scale or ignore the marks associated with such questions or parts of the questions. The use of the work of another student, past or present, constitutes plagiarism. Giving your work to another student to use may also constitute an offence. Collusion is a form of plagiarism and will be treated in a similar manner. This is an individual assessment and thus should be completed solely by you.*

*The College will investigate all instances where an examination or assessment offence is reported or suspected, using plagiarism software, vivas and other tools, and apply appropriate penalties to students. In all examinations, we will analyse exam performance against previous performance and against data from previous years and use an evidence-based approach to maintain a fair and robust examination. As with all exams, the best strategy is to read the question carefully and answer as fully as possible, taking account of the time and number of marks available."*

### **Remote-assessment guidelines for students**

1. You should prepare for time-limited remote assessments as you would for formal written exams.
2. You will require an internet connection, a device which can access and upload to GitHub Classroom, plus a smartphone or tablet with a camera (or a digital camera). You will also need paper and writing materials.
3. You will need to identify quiet space where you can undertake the assessment without disturbances and on your own - this is not a group assessment. If you need to travel to such a place, and if travel is allowed at the time of the assessment, then you should allow suitable time as you would for a formal written exam at the College.
4. You should ensure that all device operating systems and anti-virus updates have been completed prior to the start of the exam. This will prevent any unexpected

updates occurring during the exam that might prevent you from successfully submitting your exam paper. You should also ensure that you have sufficient battery power or access to a power source for the duration of the exam.

5. It is acknowledged that some students may feel they do not have access to suitable space. If you feel your performance has been hampered by the venue in which you are completing the assessment you should submit a claim for mitigating circumstances. If you do not have the equipment needed to undertake the time-limited remote assessment, you are advised to contact [y.ashton@imperial.ac.uk](mailto:y.ashton@imperial.ac.uk) as early as possible.
6. The question paper and any reference materials will be shared via Github Classroom, 5 minutes before the scheduled start time. You will receive a GitHub Classroom invitation via email to your College email address. The GitHub Classroom invitation link will also be posted on the Teams acse8 channel.
7. You should handwrite your answers on paper (ideally A4 in size), in clearly legible ink, using both text, symbolic maths, drawings, sketches, non-Latin characters etc, as appropriate.
8. You should put your CID on the first page of your answer script. NO OTHER PERSONAL INFORMATION SHOULD BE INCLUDED ANYWHERE ELSE IN THE ANSWER SCRIPT.
9. Unless you have special exam arrangements, you must stop writing at the end of the exam time indicated on the front of the exam paper. We cannot police this, but please remember that there is an important element of trust in this process. After this time, you are allocated an additional 30 minutes for scanning and uploading. If you attempt to use this time to do additional writing then you are violating the exam regulations, as well as establishing an unfair advantage over your peers. You are also risking failing to complete your upload in time.
10. You are advised to clearly number the pages of your answers, photograph/scan these pages (ensuring that the photographs/scans contain all the relevant information on every page, including the page number) and upload images as an electronic submission, normally, in pdf format, as one document. This exercise provides a timestamp for the submission. We suggest using the MS Office Lens app for this purpose. There are instructions on how to do so at the end of this document. Note that the Office Lens app has a limit of 10 pages per document on Android. Should you encounter this issue, you may upload more than one pdf. You should ensure you are comfortable performing scanning and combining pages prior to the exam. The submissions will also be timestamped by GitHub Classroom.
11. Special exam arrangements will be accommodated in the same way as for previous written exams:
  - a. Students with extra time allowances will have this added on to the exam time, followed by the same 30-minute scanning and upload time.
  - b. Students with rest breaks will be required to manage these themselves, but the time will be accounted for at the end point of their assessment.
  - c. Other special arrangements will need to be replicated on a case-by-case basis
12. During the examination, any queries related to the content of the exam should be raised on the ACSE19 Team acse8 channel where Prof Dubrule will be available to assist.

13. If you have technical difficulties that delay your submission, continue to upload to Github Classroom as normal, and also email [y.ashton@imperial.ac.uk](mailto:y.ashton@imperial.ac.uk) a summary of the difficulties experienced. In the case of severe delays, you should retain the digital copy of your exam script with its original timestamp and upload to GitHub Classroom as soon as possible.
14. You must retain the hard copy of your work in case there are problems with the submission, such as illegible photographing or corruption of files, to allow these to be re-uploaded and re-submitted if required by the examiners.

### **Additional details about remote assessment**

The college has provided a student FAQ for remote assessment-  
<https://www.imperial.ac.uk/about/covid-19/online-assessment-faqs/>

## Appendix A

This is a suggested workflow for producing PDF files for upload to Github. We stress that this is just one method – there are many ways to produce a PDF file, and you can use anything that works for you. Whatever method you use, **ensure you have practiced it before real exams, and before the practice exercise as well!**

This suggested workflow uses Microsoft Office Lens, and Microsoft OneDrive. It's pretty easy and intuitive. We've provided this in two forms, one for Android phones (appendix A1), and one for iPhones (appendix A2) – choose whichever is appropriate to your device.

## **Appendix A1 - Using Microsoft Office Lens to capture exam scripts - Android Setup (do this WELL before the exams!)**

1. You need *Microsoft OneDrive* set up on your phone. You may have already done this, but if not, download it from the play store, then open it. Sign into OneDrive using your college account. IMPORTANT – when it asks for your email, use the form [username@ic.ac.uk](mailto:username@ic.ac.uk) – other forms will not work. If you can't get into OneDrive, please contact ICT for help
2. Install *Microsoft Office Lens* using the Play Store, and open it. It will ask for permissions to access photos, media and files, and to allow it to take pictures and record video. Allow these permissions.
3. Install and set up OneDrive on the computer that you are using to submit the work, and sign in on that (there are many online resources to help you with this – contact ICT if you are struggling). Remember again to sign in with [username@ic.ac.uk](mailto:username@ic.ac.uk).

### **Using Lens at the end of your remote examination**

To use Lens, make sure it is in DOCUMENT mode (Fig 1a). If you are planning on using a flash, turn it on with the icon near the top right (Fig 1a). Center the page on screen (in portrait orientation), making sure the red box frames it correctly. Click the red & white button to take the photo (Fig 1b).

Check your image on the next page (Fig 1c - you can pinch to zoom in). Is the text all legible? If it's too blurry you may need to try again – use the bin icon (Fig 1c) to throw this image away, then take the photo again. In my example here it IS a bit blurry, but it's plenty good enough to read for a title page, so no need to take it again.

To take a photo of the next page, use the add new button (Fig 1c). Don't hit Done yet (you do that when you've done ALL the photos). When you take further images, *Lens* may either give you a check-page again, or it may just add the images to the photo list with a number (Fig 1d). If it's doing the latter, then once you have a photo of the final page, hit the Red arrow button (Fig 1d).

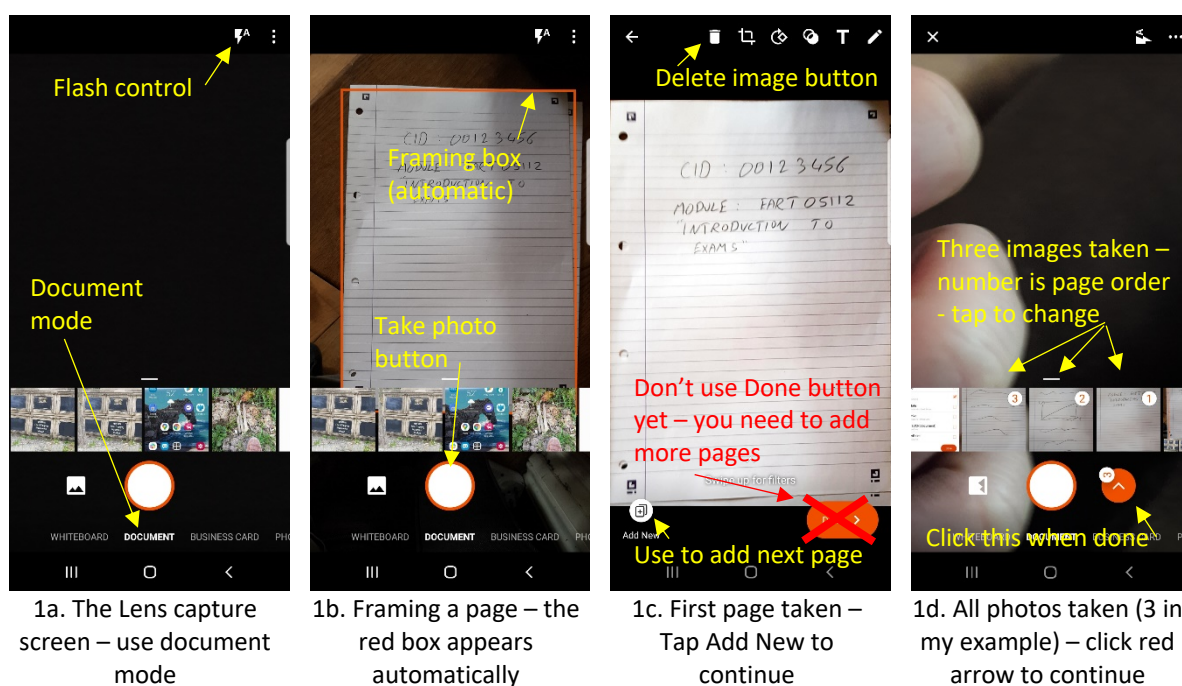


Figure 1 – Document capture in Lens.

## Appendix A1 - Using Microsoft Office Lens to capture exam scripts – Android

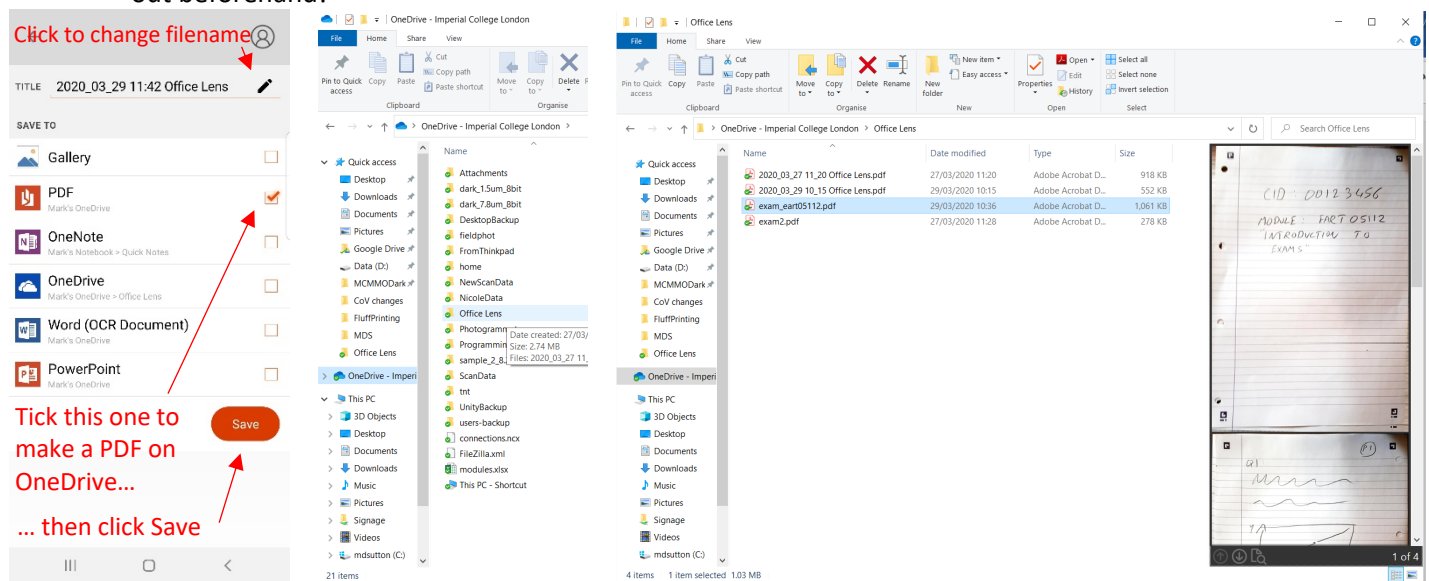
After hitting the arrow from Fig. 1d, you should now get a screen exactly like Fig. 1c – except here you can swipe left and right to flick through all the pages in your document. Check they are all legible – if any aren't good enough then delete them, and use the back button (top left) to return to document capture mode to take them again (you may have to redo the page ordering). Once you are happy, click the red “Done >” button.

If *Lens* is showing you the check-page for each image as it took them, then it's giving you the same mode as in the paragraph above each time. Once you've done your final image and you've checked they are all there (you can swipe left and right), click the red “Done >” button.

Once you hit “Done >”, you should get to the screen shown in Fig. 2a. You may want to change the filename to something more useful to you (e.g. the exam name or code), but you don't need to if you are short on time. DO make sure that the PDF option is ticked, and that underneath PDF it mentions OneDrive – if this option talks about saving to your phone, then you've not got OneDrive set up properly. Hit Save to make the PDF and send it to your OneDrive cloud storage

Finally – go to your computer, open your OneDrive folder, and locate the file. It should automatically synchronise pretty quickly. On my system it appears in a folder called ‘Office Lens’ on OneDrive (Fig 2b). Double-check that you have got the correct file (Fig 2c), then submit it to us.

The recommended submission method is to upload the file to the Github repository you are linked to. If for any reason you can't do this, email it instead to [y.ashton@imperial.ac.uk](mailto:y.ashton@imperial.ac.uk). If the file is too large to email (>10Mb), submit it using Imperial College FileExchange – if you've not used this before, try it out beforehand!



2a. Making a PDF in *Lens*. Changing filename is optional, but may help you find the right file

2b. Finding the PDF on OneDrive on your computer. For me, it appears in a folder called Office Lens (highlighted above).

2c. My exam PDF located on my computer. From here I can upload it to GitHub as I would with a normal file, attach it to an email, or (as a last resort) send it using Imperial FileExchange. Note the filesize – in my example this is around 1Mb, which is fine to attach to an email. Avoid sending attachments over 10Mb in size.

Figure 2. Making the PDF in Lens, then locating it on your computer's OneDrive folder



## **Appendix A2 - Using Microsoft Office Lens to capture exam scripts - iPhone Setup (do this WELL before the exams!)**

1. You need *Microsoft OneDrive* set up on your phone. You may have already done this, but if not, download it from the App Store, then open it. Sign into OneDrive using your college account. IMPORTANT – when it asks for your email, use the form [username@ic.ac.uk](mailto:username@ic.ac.uk) – other forms will not work. If you can't get into OneDrive, please contact ICT for help
2. Install *Microsoft Office Lens* using the App Store, and open it. Swipe to the right hand of the three intro screens, and tap Allow Access. Allow access to the camera and to your photos.
3. Install and set up OneDrive on the computer that you are using to submit the work, and sign in on that (there are many online resources to help you with this – contact ICT if you are struggling). Remember again to sign in with [username@ic.ac.uk](mailto:username@ic.ac.uk).

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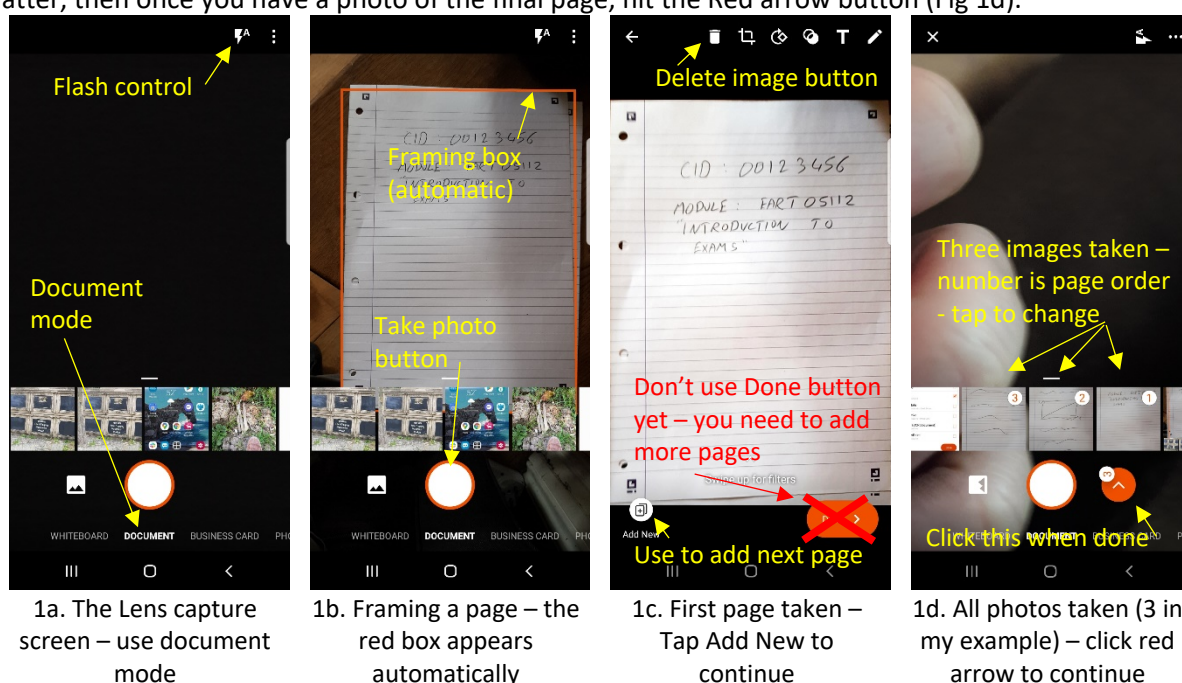


Figure 1 – Document capture in Lens. These are Android screen captures, but the iPhone version is almost identical.

## **Appendix A2 - Using Microsoft Office Lens to capture exam scripts – iPhone**

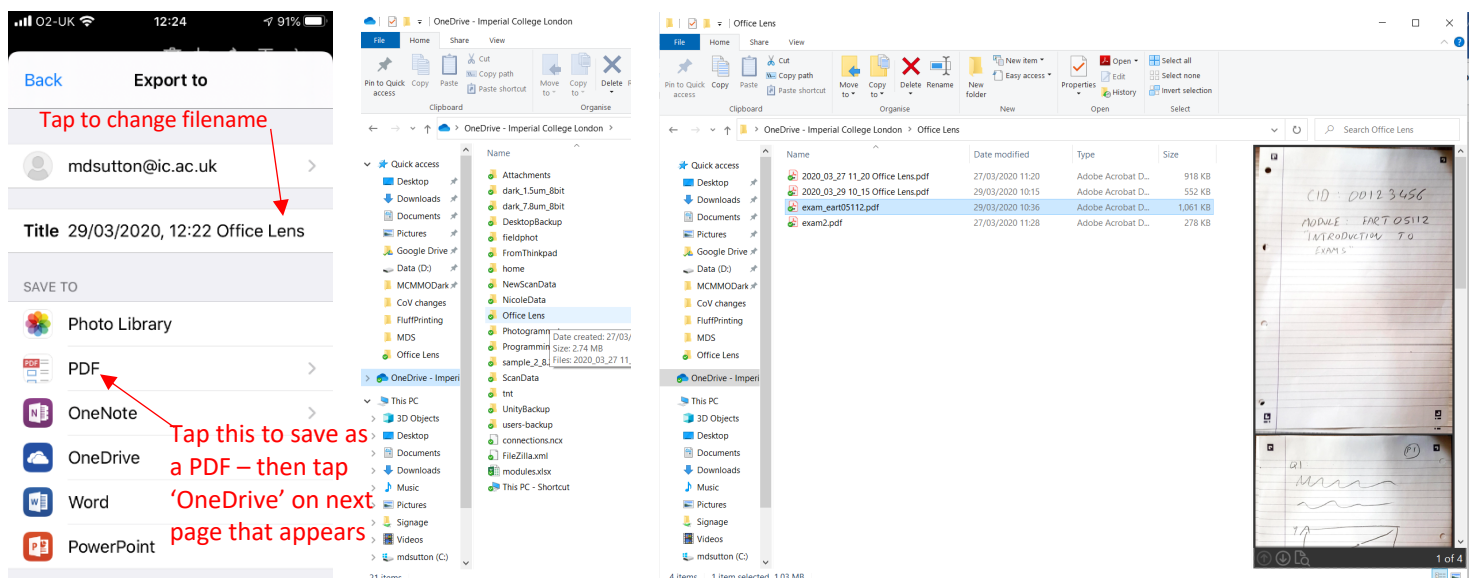
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Once you hit “Done >”, you should get to the screen shown in Fig. 2a. You may want to change the filename to something more useful to you (e.g. the exam name or code), but you don't need to if you are short on time. Click PDF, then OneDrive on the next page that appears, to send the file to your OneDrive cloud account.

Finally – go to your computer, open your OneDrive folder, and locate the file you just uploaded. It should automatically synchronise pretty quickly. On my system it appears in a folder called ‘Office Lens’ on OneDrive (Fig 2b). Double-check that you have got the correct file (Fig 2c), then submit.

The recommended submission method is to upload the file to the Github repository you are linked to. If for any reason you can't do this, email it instead to [y.ashton@imperial.ac.uk](mailto:y.ashton@imperial.ac.uk). If the file is too large to email (>10Mb), submit it using Imperial College FileExchange – if you've not used this before, try it out beforehand!



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**Figure 2. Making the PDF in *Lens*, then locating it on your computer's OneDrive folder**