



## Software to consider downloading to your personal computer 2016/17

The following document is aimed at new first year undergraduates and new MSc students in the Department of Bioengineering. It is not obligatory to do any of the activities described below prior to arrival on campus. However, you are strongly encouraged to download the software, if not before arrival, then at least soon after arrival on campus. This will save you time at the start of term and will give you the chance to have a look at the different interfaces for some much used applications.

As a new first year undergraduate if you do nothing more than download the software, it will save you time later for the modules BE1-HMath1 (laboratories), BE1-HProg1 and BE2-HProg2. If you don't have the time to explore what lies ahead, then do not worry. If you do have the time, then you will arrive on campus with a good insight into aspects of some of your modules.

As a new MSc student it is quite likely that at some point in the next year you will program in Matlab, and or a general purpose language e.g. C. These are languages that you will probably have learnt in your first degree, therefore, you can decide for yourself if you need to do some of the activities below to jog your memory.

If your memory of your undergraduate computational activities is fading, then you are encouraged to do (at least) some Matlab activities prior to arriving on campus (if possible). In the first week of term there will be an optional series of Matlab workshops aimed at those MSc students that feel that they need to jog their memory.

If you have done some of these activities prior to attending the workshop, then you will gain more from participating in the workshops. The bottom line is that it is left to the reader to decide how much of what follows should be done prior to arriving on campus and/or how much should be done in fresher's week prior to the start of teaching in week 2 of the Autumn term.

As a university student you are eligible to download various software tools, for free. You are likely to use this software throughout your degree programme. This document will now describe:

1. How to download the software on to your own computer.
2. Signpost Internet based resources that you may use to teach yourself key skills.
3. How to do some preparation (even before arriving on campus) by working through some short activities that are based on pre-university mathematics.

## 1. Download free software

As a student member of Imperial College you are eligible for:

- **MS-Office 365** which includes various personal productivity tools including the word processor that you will probably use for writing technical reports i.e. MS-Word. This includes an equation editor for embedding mathematics notation in technical reports.
- **MS-Visual Studio** is a professional software development environment for various programming languages include C and C++. Undergraduates will learn both languages in years 1 and 2, and MSc students *may* need one or other language for project activities.

As a student member of the Faculty of Engineering you are eligible for:

- **Matlab** (and all the toolboxes) is used in many mathematics and technical modules, and project activities. Matlab provides extensive support for numerical methods in many subject areas e.g. Control Engineering, Digital Signal Processing, Image Processing. Traditionally, Matlab has been used for numerical computing, but more recently it has added support for symbolic algebra, ala Mathematica, Maple.

If you download the aforementioned software before you arrive on campus you will definitely need good network bandwidth, since these programmes all have a large footprint. Consequently, you will also need plenty of disk space.

If you don't have a good enough bandwidth to make the downloading of the software feasible then don't worry, wait until you are on campus. The bandwidth in the halls of residence, and in the department will be good enough.

Owning your own computer is not obligatory, but if you do, then it offers you the flexibility to choose your preferred working environment. The standard PC installation across the college is MS-Windows, but if you already own MacOS or Linux based computer then you will probably be already aware of the emulation software (e.g. VMWare) that can run MS software.

The instructions below include hyperlinks for each of the software packages that were tested when this document was last updated (i.e. Sept 2016). Please note that when you are prompted for your college *Username* and *Password* you should use the same credentials that you have used during the application process and will continue to use throughout your degree programme. You may need to create an account to download Microsoft software.

a) To download **MS-Office 365** for your operating system:

The full download procedure is described on the ICT webpage [Install Office 365](#).

b) To download **Mathworks Matlab** for your operating system:

To download a student licensed (but full) version of Matlab:

- Go to the ICT webpage [Free Software for students](#), reveal the *Matlab* details, and click through the link "*Register for a download*".
- Enter your login details.
- Click on *Select and download software*.
- Click on *Matlab student home use*.
- Register your details, and then soon after you will be sent an email with the installation instructions and the serial key that will be needed to complete the installation.
- You will find other program that you may want to download on the ICT including: *Symantec* AntiVirus software, *Solidworks*, *VMWare* etc.

c) To download **MS-Visual Studio** for MS-Windows:

MS-Visual Studio Community may be downloaded directly from the [Microsoft webpage](#). Select the current version available, which will be a more recent version than the version installed on the departmental PC i.e. MS-Visual Studio Professional 2013 (Update 3). The interface may be slightly different, but all the basic activities will be the same for C or C++ program development. It may also be downloaded via the ICT Software Shop.

## 2. Self-tuition using Internet resources

a) Even if you are not familiar with MS-Office, you will quickly learn how to use it, by just using it! Therefore, you will probably not need any guidance with the basics. However, you are encouraged to explore advanced features like the *equation editor* for embedding mathematics notation into a technical report. You may like to read and watch the resources provided by the [University of Waterloo](#).

b) Matlab is a computational tool that is widely used in many of the Faculty of Engineering taught modules and project activities. Matlab is a skill that will be sought by your future employer. It is likely it will be needed throughout your professional life as a practising engineer. Quite simply, mastering Matlab might be the skill that underpins your career as a Bioengineer.

- First year undergraduates will learn how to use Matlab to do Symbolic Algebra in the Autumn term, and for Numerical methods in the Spring term. Once you have installed Matlab on your own computer, and you have been enrolled on your Blackboard modules, you will be able to download a zipfile all the laboratory activities for the year. Read the contents of the file ReadMeFirst.pdf which is located at the root of the unzipped filespace.
- MSc students will have a set of optional Matlab workshops in fresher's week. You can decide for yourself whether you need to attend. There are a number of excellent self-instruction tutorials that can be found on the Internet. For example, the University of Edinburgh's, [School of Engineering](#) have audio-visual tutorials, reference documents and exercises. You can use the course to help you to decide if you need to attend the optional workshops. Therefore, you are strongly encouraged to follow this course prior to arrival. The purpose of the fresher's week optional workshops is focus support on those that most need it, so please do not feel under obligation to attend, if you do not need to. If you do need Matlab support, then please do attend. Note that no register will be taken.

c) MS-Visual Studio (MS-VS) can be used for program development in C, C++ and other languages. First year undergraduates will learn how to program in C in the Spring term of year 1, and then C++ in year 2. The first year programming module starts with a microcontroller programming (in C) workshop based on the Arduino.

If you are eager to start using MS-VS, then use a Shockwave Flash (swf) enabled browser to watch the videos describing (1) the [configuration](#) of MS-Visual Studio and (2) [Creating](#) your first program. It uses an old version of MS-VS, therefore the interface will look different but the steps in the process are the same.

### 3. Learn by doing

If you have downloaded Matlab AND MS-Visual Studio AND you have learnt enough to start using either or both AND you have the time, then you might like some activities to explore. The folder called [UGPrearrival](#) contains a small number of activities in a file called [computingActivities.pdf](#)

The simple applications invite a computational solution. You will find that the folder contains sub-folders with solutions coded in Matlab, C and C++.

- First year undergraduates may like to *optionally* skim-read the solutions and perhaps cut-and-paste the solution code into the Matlab and/or MS-Visual Studio. Do not spend too much time on this as there is a lot of detail that will be described in modules in the next year. If you are in the minority that have previously programmed then the activities may satisfy some of your curiosity.
- MSc students can use the coded solutions to contrast the syntax and semantics of the three languages. If you learnt C, then examine the C++ solutions which embed C and C++ solutions (where one is commented out). It is not certain that your MSc project will require any programming, however, it is likely to be a useful skill, and a mechanism for obtaining results. If you would like a greater challenge, then convert your coded solutions into functions that can be invoked from `main()`. You will find function based solutions in the Matlab sub-folder that can be used as a template for C/C++ functions.

To reiterate all the above is *optional*. For first year undergraduates if you can download, and start to use the aforementioned software then you are getting a head start. For new MSc students it would be very helpful if you skim-read the above so that you identify cracks in your knowledge, and therefore you can arrive with questions that can be answered early in the term.

If you have any questions about the above, please do contact me.

Best wishes,

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