

ECE 101 Requirements Guide

INTRODUCTION

The ECE 101 Exploring Electrical Engineering course requires students to use certain engineering software and hardware, so here is a guide about these requirements.

1. PSU D2L account (free access)
2. MCECS account (free; set up if you don't have one already)
3. Traditional paper textbook (purchase in PSU bookstore)
4. CATME account (free)
5. MATLAB software (optional purchase)
6. Portable computer (highly recommended to purchase if you do not already have one)
7. Calculator (purchase, if you do not already have one)

First four items are essential so get them done as soon as possible, but not later than the 2nd lecture of the first week (October 1, 2015).

PSU D2L account

If you are enrolled in ECE 101, you should already have access to the course's Desire2Learn (D2L) site, which is an online learning management system. D2L will be used by students for electronic submission of projects etc.

If you are new to D2L, review this tutorial: <http://www.pdx.edu/oit/online-class-support>

How to access D2L

- Go to this website: <https://d2l.pdx.edu>
- Log in using your PSU Odin username and password.
- In the *My Courses* area of the homepage, select:
ECE-101-002: EXPLOR ELECTRICAL ENGINEERING (Fall 2015)

MCECS Account

If you went through PSU's official orientation then you should have an MCECS computer account already. If not, you should go to FAB 82-01 where the CAT Help Desk is located (aka DogHaus). Bring your PSU ID and allow 24 hours between registering for the class and requesting account.

Textbooks

Both of the books below will be helpful not just for this class but for your entire studies.

Required:

Title: Introductory Mathematics for Engineering Applications
 Authors: K.S. Rattan and N.W. Klingbeil
 Publisher: Wiley, 2015
 ISBN: 978-1-118-14180-9
 Notes: All the math you need to get started with ECE; make sure that you get 2015 version – previous versions had errors. There is also an e-text version but I have not tried it.

Recommended:

Title: Engineering Your Future: A brief introduction to engineering (5th ed.)
 Authors: W.C. Oakes and L.L. Leone
 Publisher: Oxford University Press, 2015
 ISBN: 978-0-19-934805-3
 Notes: a lot of good advice and description of “soft” engineering skills; this is excerpted from a larger (and more expensive) book

CATME account

In order to form teams of students it is essential that you create an account at info.catme.org. You will receive an invitation to sign up as a student in ECE 101 – please do that at your earliest convenience but not later than the 2nd class of the first week. Initially, you will only fill in a survey for “CATME Team-Maker” which will automatically assign team members. I will do a check on the list before finalizing the teams. Later on during the term you will be asked to fill “CATME Peer evaluation” which will help me determine how well your team is functioning and if everyone is contributing. I would strongly advise you to watch their introductory video, available at <http://info.catme.org/catme-student-videos/> as well as reading their FAQ.

MATLAB Software

In ECE 101 you will use MATLAB for some very simple but useful tasks. In ECE 102, however, major goal of the course is to introduce MATLAB technical computing language to students, which is used to perform calculations, create technical graphs, and write programs. You will also use MATLAB in your sophomore circuit classes (ECE 221/2/3) and upper division classes. It is a very useful tool for solving engineering problems and here are some options for getting access to it:

Purchase MATLAB

Mathworks offers a low-cost student version that you can buy online from their website.

http://www.mathworks.com/academia/student_version

There are two choices (either one is fine):

- **MATLAB and Simulink Student Suite (\$99)**
This suite includes Simulink and ten of the most popular add-on products.
- **MATLAB Student (unbundled, \$49)**
Only MATLAB itself is included, but you can buy add-ons à la carte.

MATLAB can be installed on Microsoft Windows, Apple Mac OS X, and Linux computer systems. If you buy the student version, you also get “MATLAB Online”, which is a cloud-based version that can be accessed through a browser on any web-enabled computer, tablet, or smart phone. Note that the instructors have not tried the “MATLAB Online” option yet to examine how well it works.

Although the student version is not upgradeable, the license allows you to use it until you graduate. If you are intrigued by its capabilities or you are certain that you will continue your studies in ECE then purchasing the student version is recommended.

Installing MATLAB on your laptop

This should be a fairly straightforward process once you purchase the software. However, students have occasionally run into problems. Instructors and TA-s for ECE 101 cannot debug your installation but MATLAB technical support should be able to help you.

Access MATLAB via Remote Desktop

PSU MCECS has a Microsoft Windows terminal server that can be accessed through the Remote Desktop service. This allows you to connect via VPN to your MCECS Windows account from any Windows laptop PC (or an Apple Mac with the free Microsoft Remote Desktop app installed). Once logged in, you run standard MCECS applications such as MATLAB, but the response speed depends on network conditions.

Details on installing remote terminal server and VPN can be found here:

<http://cat.pdx.edu/windows/remote-desktop-access.html> and
<http://cat.pdx.edu/network/remote-access-5.html>

Follow the procedure to set up remote terminal server and VPN on your laptop or home PC. You should be able to connect to it from home. Once you are in class you will need to log onto PSU wireless network and should be able to access MATLAB. These procedures are supported by the CAT (Computer Action Team) and you should seek their help if you run into problems.

Access MATLAB in ECE and MCECS Labs

The major ECE labs (e.g., FAB 60-01, FAB 60-04) and MCECS computer labs (FAB 55-17, EB 325) all have MATLAB installed on them. If you have a valid key card to enter the rooms and an MCECS Windows account, you can use the lab version of MATLAB for free. While not useful for most in-class activities, it is a good backup if you forget to bring your portable computer to school but still need MATLAB access for doing homework or projects.

Portable Computer

In ECE 101 you are not required to own and bring your personal portable computer (laptop). However, this will be required in ECE 102. Furthermore, in ECE 101 each team/group will be required to have at least one laptop during lecture times so that you can work on in-class activities and project results on classroom screens (FAB 10 has four of these). Therefore, it is recommended that you purchase a laptop because you will need it sooner or later.

What if I don't have a computer?

We understand that selecting and buying a computer is a big decision and potentially expensive. However, you will likely use it in many other engineering and science courses, so it is an excellent investment for your academic career. There are many brands and models to choose from, but you need to decide which operating system you want to use (Microsoft Windows, Mac OS X, or Linux). Some engineering software packages may only be available on certain platforms. Popular engineering software is typically well supported on Windows machines, and also on Mac/Linux computers to a lesser extent.

MATLAB runs natively on all three major platforms. Just make sure you get a system that is powerful enough to run the required software.

MATLAB specs: http://www.mathworks.com/products/matlab/choosing_hardware.html

Notes:

In ECE 101 there is no reason to prefer one operating system over another. However, in ECE 102 there is a preference for Windows based systems due to their native support of LabJack device drivers. This seems to have become less of an issue on Mac OSX systems due to availability of free virtualization software. If you already have a Mac then do not buy another Windows-based computer (yet). If you have not yet purchased a system then consider Windows-based system as well as others.

Calculator

As an engineering student, you should have a good quality hand-held calculator to assist you on homework and exams. For ECE 101 and 102, you will need a basic scientific calculator. Typical features include:

- Standard arithmetic ($+$, $-$, \times , \div)
- Square (x^2) and square root (\sqrt{x})
- Inverse ($1/x$) and raise to a power (y^x)
- Exponentiation: 10^x , e^x
- Logarithm: $\log(x)$, $\ln(x)$
- Trig functions: $\sin(x)$, $\cos(x)$, $\tan(x)$ and their inverses $\sin^{-1}(x)$, $\cos^{-1}(x)$, $\tan^{-1}(x)$
- Scientific notation display, degree/radian modes
- Complex numbers are not needed in ECE 101 and 102 but you will need them later

Of course, you can get a more sophisticated model for your other math, science, and engineering courses, but higher-end features are not needed for ECE 101 and 102. Standalone calculators from Texas Instruments, Hewlett-Packard, and Sharp are popular. If you have a portable device that runs iOS or Android, there are many excellent calculator apps available. Note that typically only standalone calculators are allowed on exams.