

Introduction to the Lab

Autumn Term 2022

Dr Ed Stott

What is the lab?

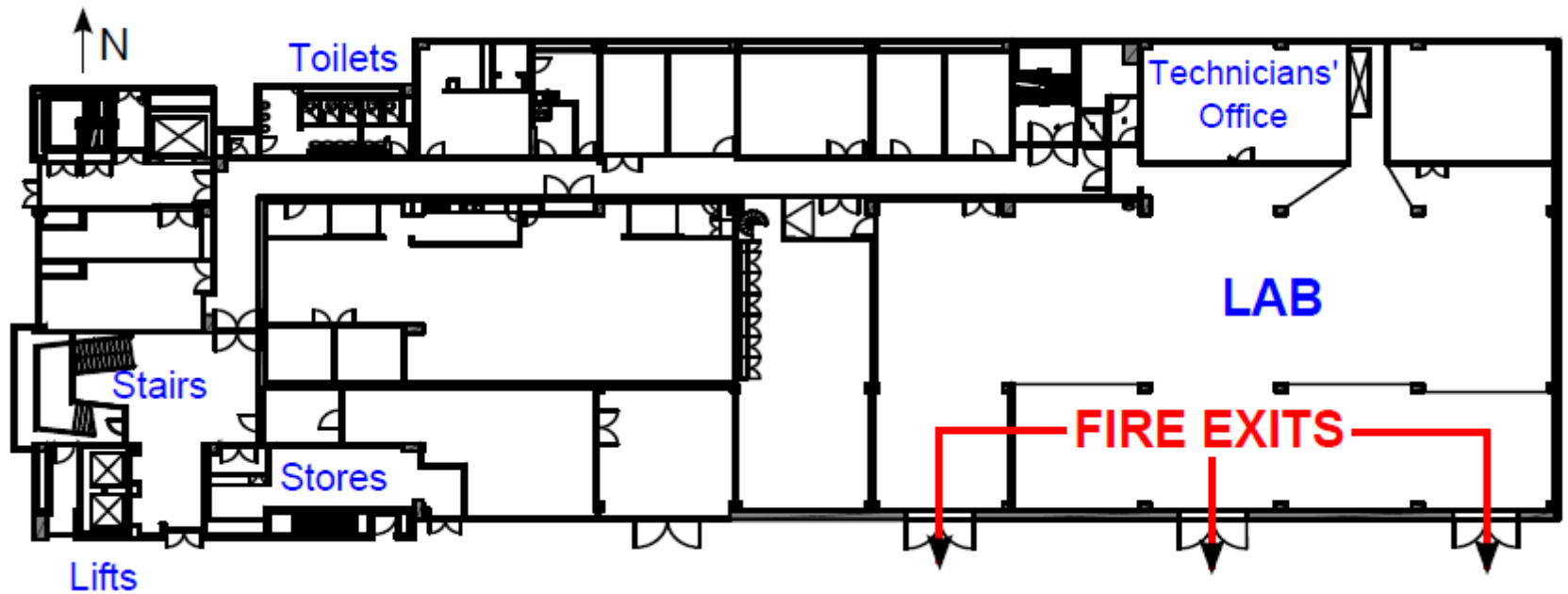


- Experiments
- Learn important skills
- Back up theory from lectures

What happens in the lab?

- Each term
 - One lab skills experiment
 - One experiment for Analysis and Design of Circuits
 - One experiment for Digital Electronics and Computer Architecture
- You are assigned lab pairs (mostly)
- Pairs change in the Spring Term

Where is the lab?

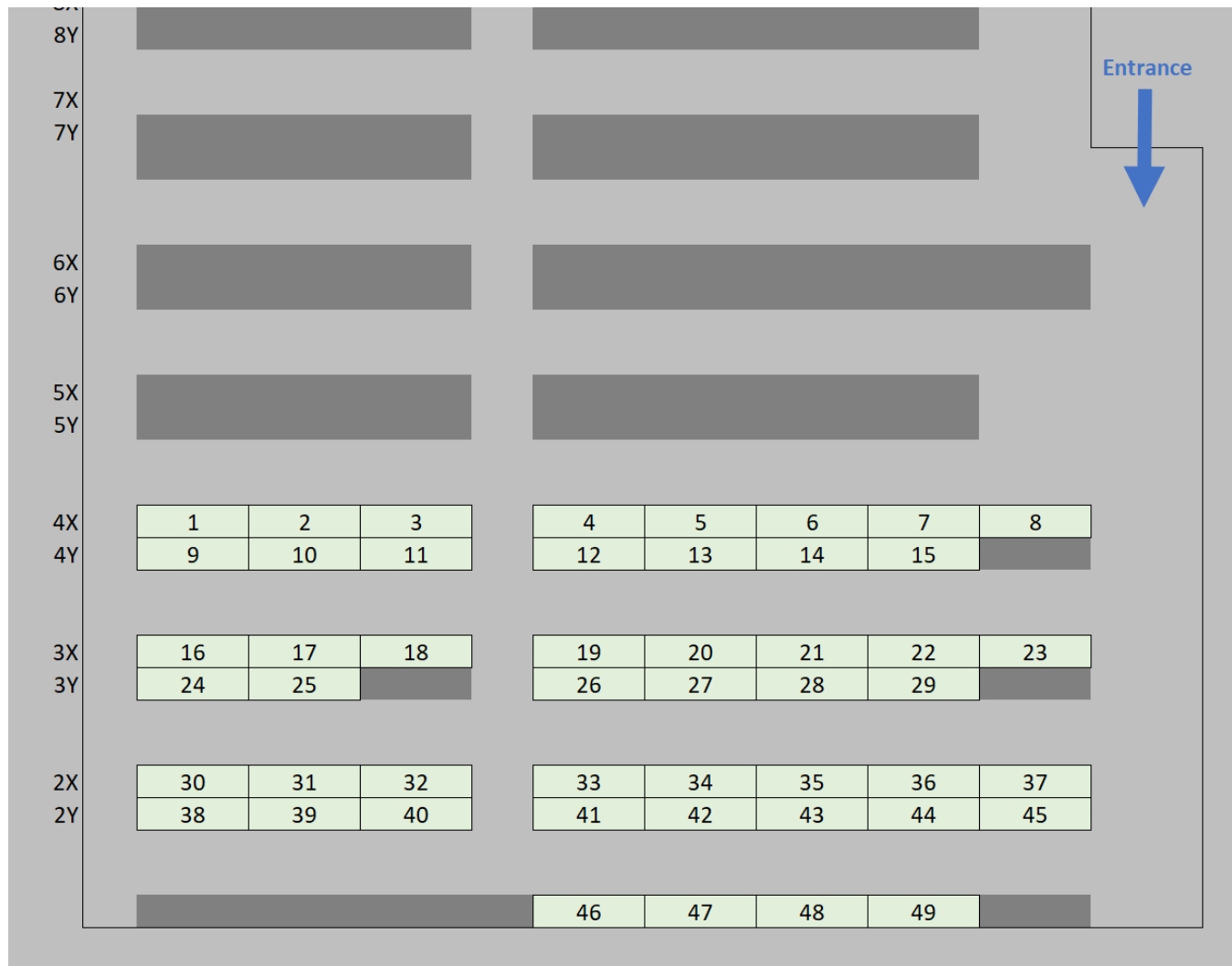


Lab Pairs

- See table online
- Everyone arranged into Lab/Study groups
- Within that, lab pairs
- Sit at the bench number that matches your pair code

	A	B	C	D	E
1	First Name ▼	Last Name ▼	Lab/Study Group ▼	Pair Code Autumn ▼	
2	Arya	Yang	1	A01	
3	Archisha	Garg	1	A01	
4	Arjan	Hayre	1	A02	
5	Alex	Seferidis	1	A02	
6	Arundhathi	Pasquereau	1	A03	
7	Beth	Cham	1	A03	
8	Tingxu	Chen	2	A04	
9	Ching Bon	Tang	2	A04	
10	Jungwon	Bae	2	A05	
11	Tianqi	Hu	2	A05	
12	Constance	Geneau de Lamarliere	2	A06	
13	Ajay	Samaranayake	2	A06	
14	Eddie	Moualek	3	A07	
15	Sara	Chehab	3	A07	
16	Kiara	Rao	3	A08	
17	Raymond	La	3	A08	
18	Yiyao	Zhou	3	A15	
19	Sophie	Jayson	3	A15	
20	Ilan	Iwumbwe	4	A09	
21	Yinchao	Yang	4	A09	
22	YAOHAN	HUANG	4	A10	
23	Rishabh	Varia	4	A10	
24	Hrishi	Venkatesh	4	A11	

Seating Plan



Lab information

- Lab instructions on GitHub
 - <https://github.com/edstott/EEE1labs>
- Ask people!
 - Your lab partners and other students
 - Staff and TAs in the lab
 - Post a question on ed Discussion using the 'Labs' tag
 - <https://edstem.org/us/courses/30206/discussion/>
 - Ask me via Email or Teams PM

When is the lab?

- Supervised, compulsory sessions

A Group	Mondays 14:00-16:00	Thursdays 15:00-17:00
B Group	Tuesdays 14:00-16:00	Thursdays 14:00-16:00

Register your attendance



Lab Safety Rules

Rule 1

No work in the lab
without staff present



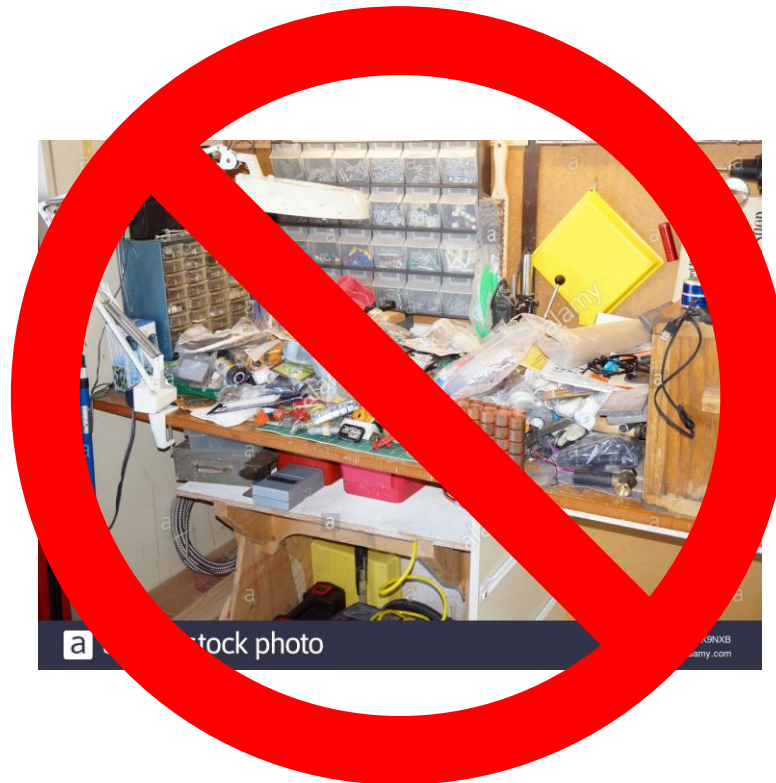
Rule 2

No eating or drinking
(except water)



Rule 3

Keep your bench tidy



Rule 4

Do not remove or relocate equipment without the permission of staff



Rule 5

Notify staff of any faulty equipment



Rule 6

Wear safety glasses when soldering (Spring Term)



Rule 7

No open-toe shoes



People in the lab

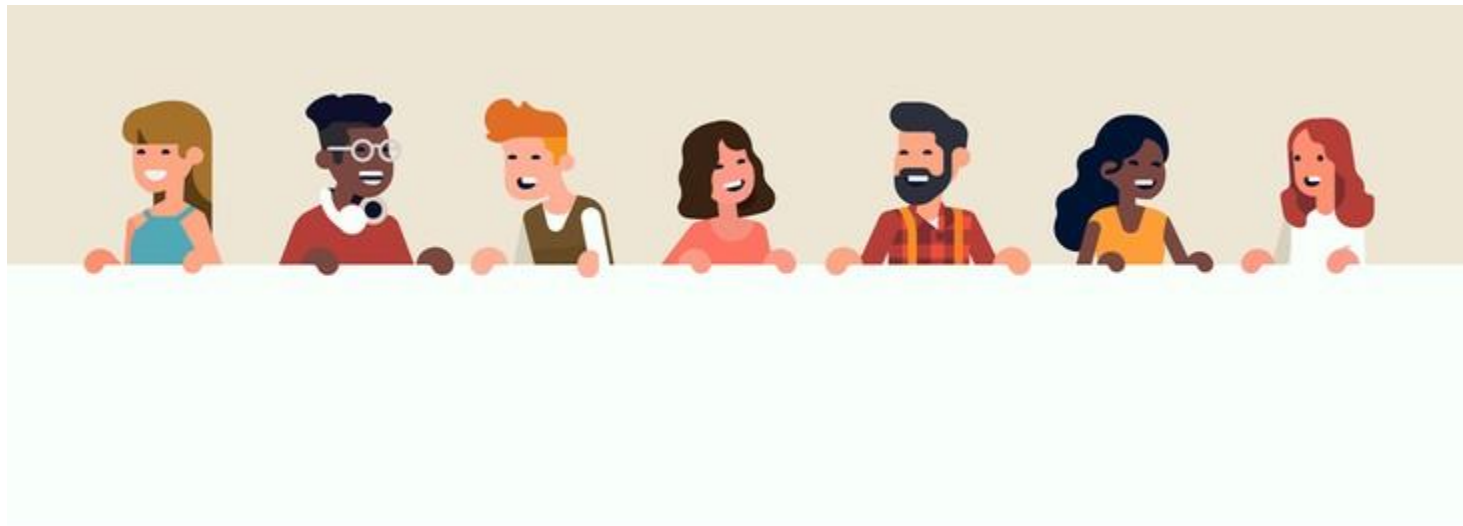
People in the lab - GTAs

- Graduate Teaching Assistants
- Studying for PhD in the department



People in the lab - UTAs

- Undergraduate Teaching Assistants
 - They have done these labs before so they know what it's like to learn

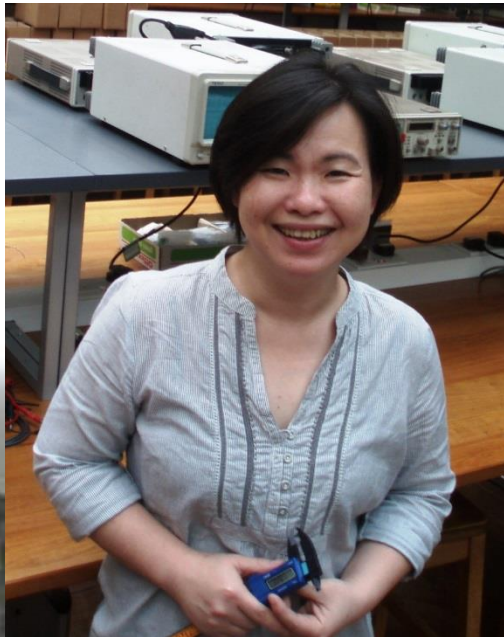


People in the lab - Technicians

- Important to be in their favour!



Amine Halimi



May Tang



Vic Boddy

People in the lab - Academics

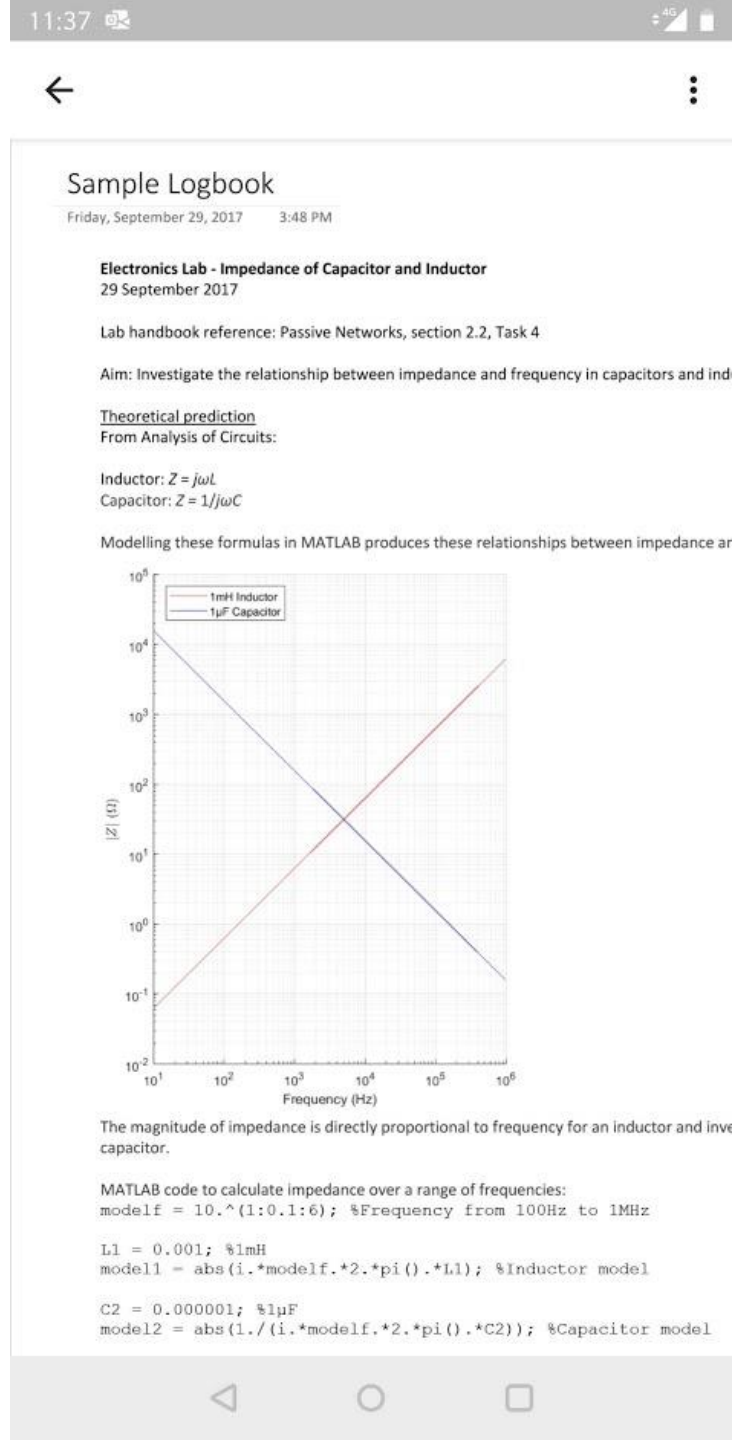
- There to help you learn



Logbooks

Logbooks

- Logbook helps you get the most of the lab
- You need to record:
 - What you are planning to do and why
 - What you did and what data you produced
 - What you thought about it
- You will need the logbook in assessments



Logbook content suggestions

- Text
- Drawings
 - Draw on device or photograph of paper sketches
- Photos and videos
 - Photos of things you've made, experiment/equipment setup
 - Annotate to highlight points of interest
- Web links
- Document clips, e.g. device datasheets
- Screenshots of lab software
 - Can also save oscilloscope screenshots
- Tables and Graphs
 - For quantitative results

Electronic Logbook

- We recommend Microsoft OneNote
 - Multiple device support
 - Cloud-based
- You'll need to bring a suitable device
- Laptops can be borrowed from Stores



Logbook hints

- Do make notes as you go along
 - Don't write everything afterwards
 - Instead, go back and reflect on what you learned
- Do copy and paste material from other sources
 - Except large amounts of computer code
- Don't edit old work as you discover new things
 - Record of thought processes, not a formal report
- Don't copy from other's logbooks
 - Defeats the purpose of the logbook as a learning aid

Learning and assessment

Learning in the lab

1. Do the preparation
 - Each section of the experiment has a preparation activity
2. Use the opportunity for self-assessment
 - Does it work as you expected? Why? Why not?
 - How does this relate to what I know from lectures and study groups?
3. Talk to your lab partner and others
 - Did you observe the same phenomenon as me?
4. Ask the staff, UTAs and GTAs for feedback
 - Why did this happen? Is my circuit built well? Am I using my logbook properly?
5. Prepare for the assessments
6. Use lab skills and principles in your project (Summer Term)

Assessments

- Feedback in week 7
- Oral/Demo assessments in week 11
 - One per topic (ADC and DECA), per term
 - Show the marker what you've done and explain how it works
 - Physical demo and logbook content
 - Each is worth 15% of the relevant module
 - Conduct in pairs but marks may differ
- Lab content also used in group project
- And helps with your theory exams

Timetable

Week	Lab Session	Lab Session
1		
2	Skills	Skills
3	Skills	Skills
4	ADC	DECA
5	ADC	DECA
6	ADC	DECA
7	Catch-up/Feedback	Catch-up/Feedback
8	ADC	DECA
9	ADC	DECA
10	Catch-up	Catch-up
11	Oral exam	Oral exam

Lab Skills Experiment

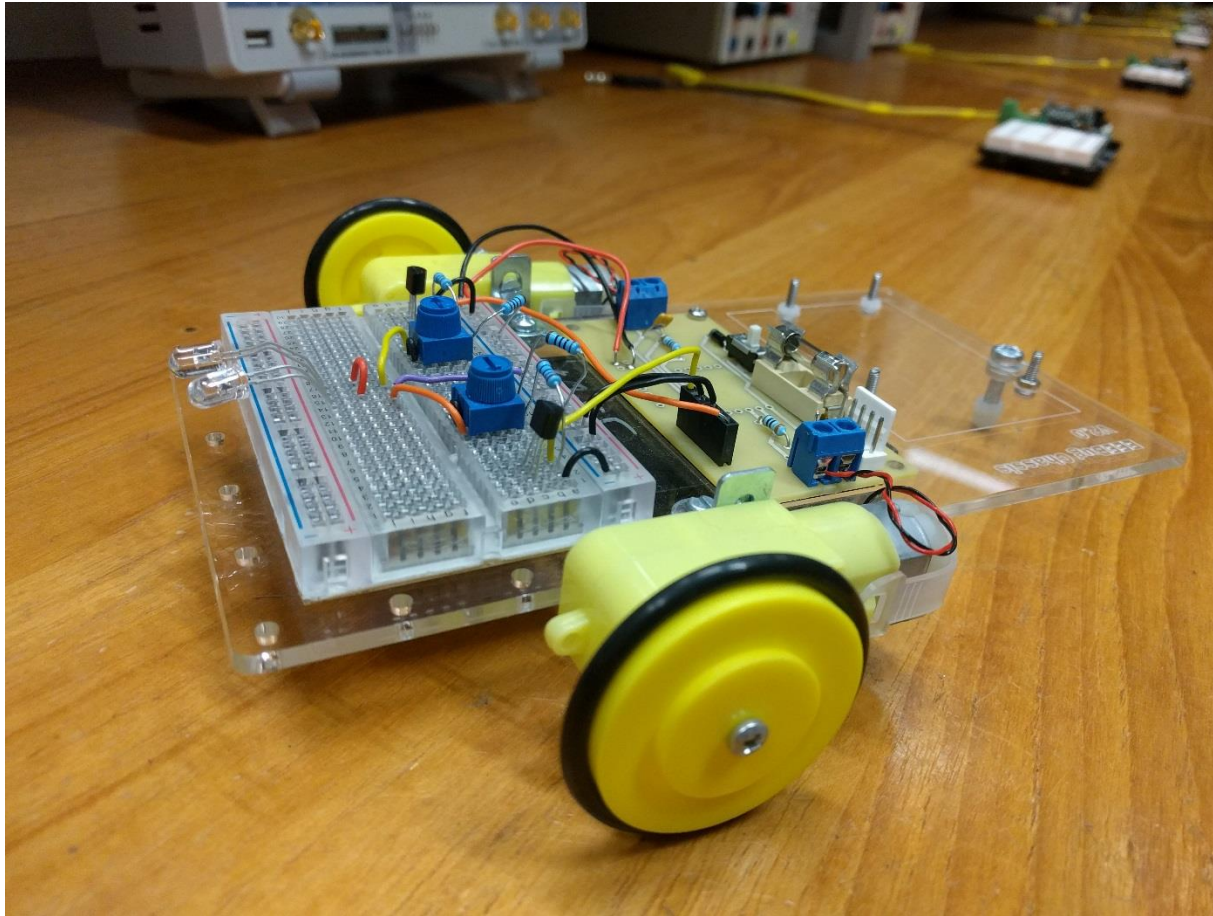
Build a simple electronic system and look at the signals that make it work

Get your Lab-in-a-Box

- Each person has a Lab-in-a-Box
- Look for your name
- Keep your Lab-in-a-Box for the whole academic year. It has most of the items you need to do the labs



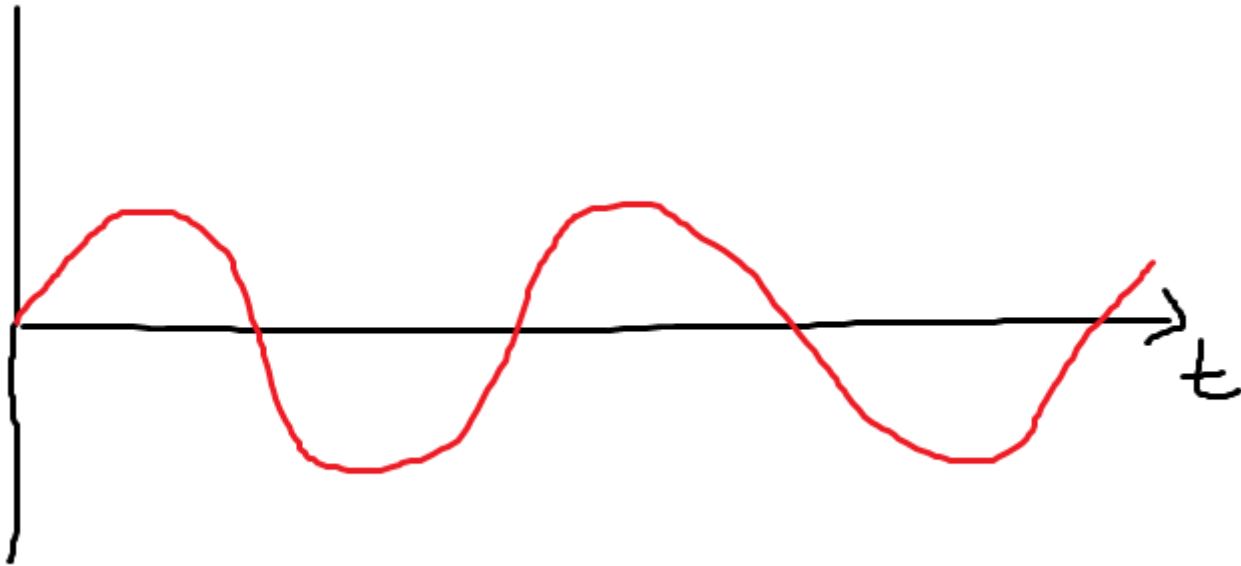
EEEBug



- Platform for Autumn and Spring Term skills experiments

Signal

- A signal is a quantity that varies with time to convey information



Types of signal

- How do we identify a signal?
- What types of signals are useful in electronics?

Signals are crucial in every area of electronics

Oscilloscope

- Displays signals (usually voltage)
- Measures properties of signals. E.g.
 - Amplitude
 - Frequency
 - Rise-time
 - Noise
- Very important diagnosis tool!



Practical Lab Skills

- Identifying components
- Solderless breadboard
- Using a multimeter
- Using a bench power supply
- Reading a circuit diagram

Practical Lab Skills

Very useful skills

- For future labs
- For project work
- For your own projects
- For work in industry

Put your knowledge into practice

Next steps

Next Steps

1. <https://github.com/edstott/EEE1labs>
2. Look up your lab pair code
3. Look up your bench location and go to it
4. Pick up your Lab-in-a-Box
5. Find the instructions for Lab Skills
6. Follow the instructions