

Introduction to NetLab ECT practical # 1

NetLab is the UniSA remote laboratory which you can access at URL: <http://netlab.unisa.edu.au/>. Its main page is shown in Figure 1. Click on the "Click Here to Enter". On the next page click on "Use NetLab" and then select "Create an Account". An online registration form will appear as shown in Figure 2.

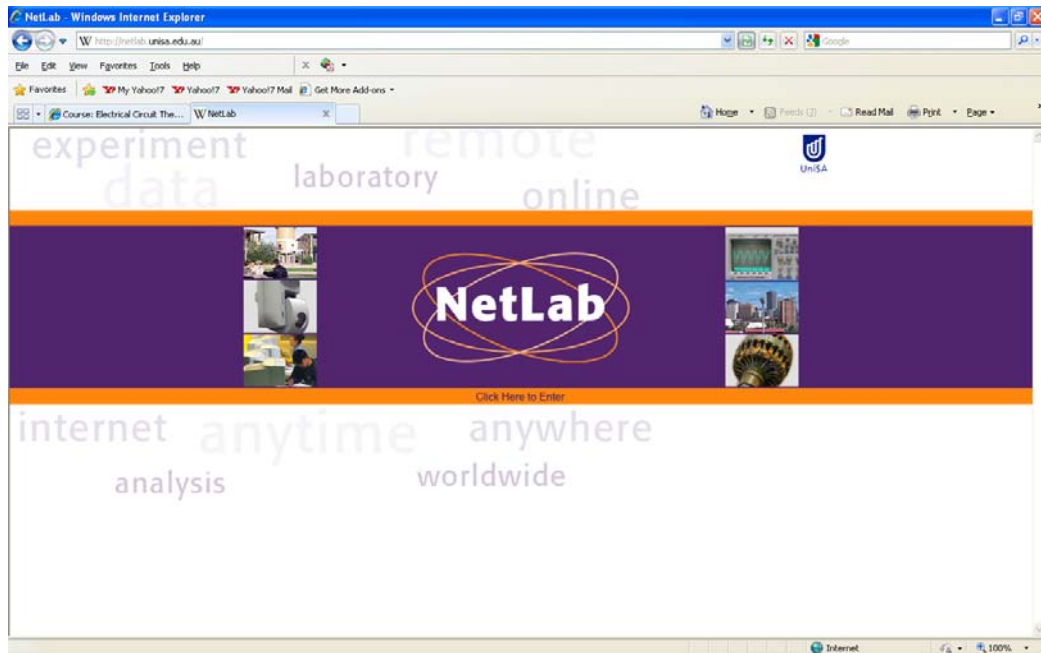


Figure 1. NetLab main page

1. Registration

To use the NetLab you first need to register in order to create a NetLab account as shown in Figure 2. Fill in the online registration form to create a NetLab account. You can enter any username and password you like. However, you must use your correct first name and family name so that our record shows that you performed the required experiments. Select country from where you are accessing the NetLab. This is important for the NetLab booking system to show your bookings in your local time.

Figure 2. Register to create a NetLab account

2. Booking

From the Use NetLab menu now select "Booking". Use your NetLab account details to log on. A booking page similar to the one shown in Figure 3 will appear. Select a day on the calendar and click on time to book a session. There is a booking limit of 3 hours per 7 days per user. You can book your time to use the NetLab in 1 hour time slots. Green buttons show available places. Red buttons show booked places. Blue buttons show your bookings. Each time slot shows 3 buttons for 3 "seats". If you want to work alone, book all 3 seats. If you want to work with another student only, you can book 2 seats and he or she should book the remaining one seat. If you work in a group of 3 students, each student should book one seat in the same time slot. If you make a mistake or change your mind, just click on your blue button again and it will clear your booking. Advise your group partners of your bookings so they can book the same time slots if you want to work together. If you position the cursor over a red button it will show the name of the student who booked the time slot.

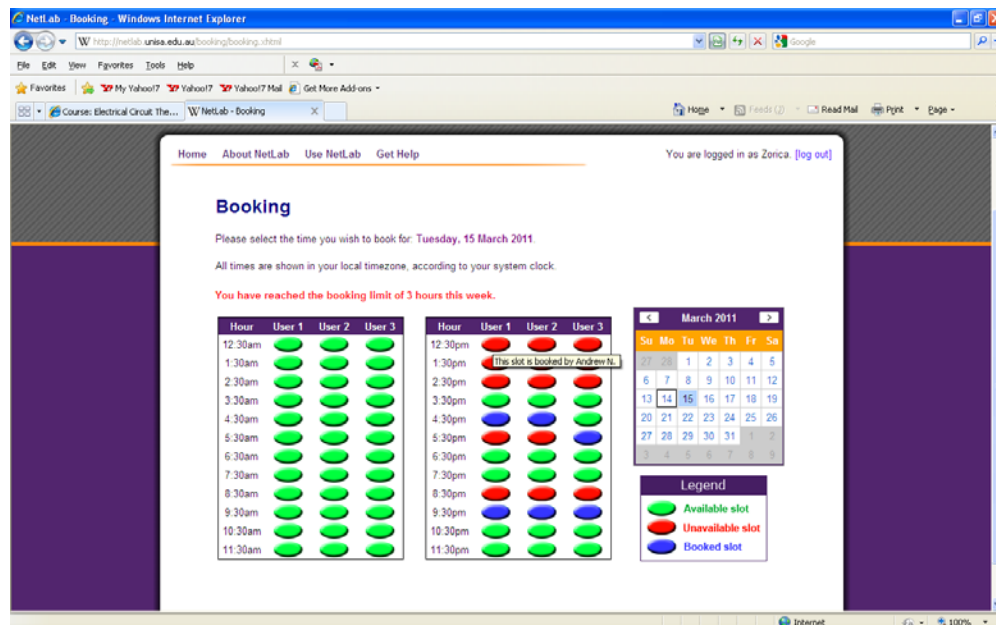


Figure 3. Book time session(s)

3. Java Run Time Environment (JRE)

From Use NetLab menu now select "Launch NetLab". Read carefully the information on the screen about the software (Java) that you may need to download and install on your computer to be able to use NetLab. All computers in computer pools at Mawson Lakes Campus have this software already installed. However, your laptop or your computer at home may not have it; so you may need to obtain a copy of this software from the website: <http://www.oracle.com/technetwork/java/javase/downloads/index.html> (Download JRE is recommended) and to install it before you start the experiment.

4. Launch NetLab

When you are ready to perform the experiment, from Use NetLab menu select "Launch NetLab" and click on the "Launch NetLab" link or on the NetLab logo at the bottom of the NetLab Access page to start the experiment. The Java program may take some time to download onto your computer depending on the speed of your connection. You may see a window shown in Figure 4. Please be patient.

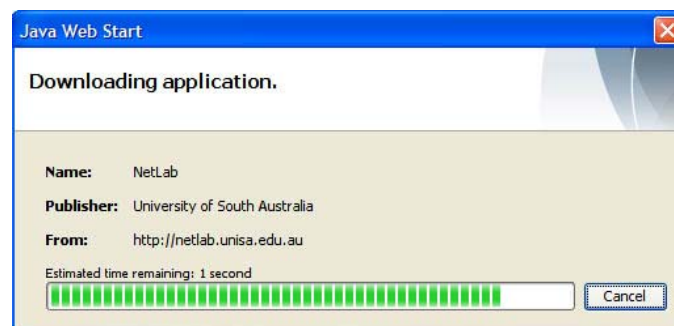


Figure 4. NetLab client may take some time to download on your computer.

You may also see the security warning window as shown in Figure 5 and you will need to click on “Yes” to allow the program to download on your computer. When prompted, use your NetLab account details to log on as shown in Figure 5.

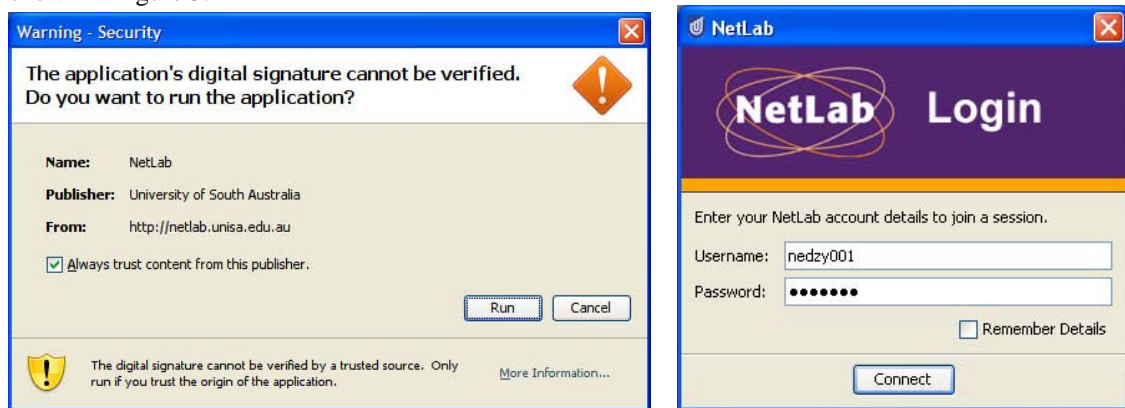


Figure 5. Security Warning and log-on prompt

You should now see the NetLab graphical user interface (GUI), as shown in Figure 6. To control the instruments you will need to activate their GUIs from the **Instruments** menu.

Switch on the web camera to see the equipment in the lab. You can fully control the web camera including pan, tilt and zoom. The camera has 10 pre-set positions so you can select them to quickly move the camera to these positions. Sometimes these positions are not correctly set, so you will need to move camera yourself to desired positions.

You can communicate with your group partners using the chat window (lower left-hand side corner). Status window (lower right-hand side window) broadcasts actions of all users, so you would know when someone changes the input signal or is moving the camera. Now you can proceed to perform the 1st experiment.

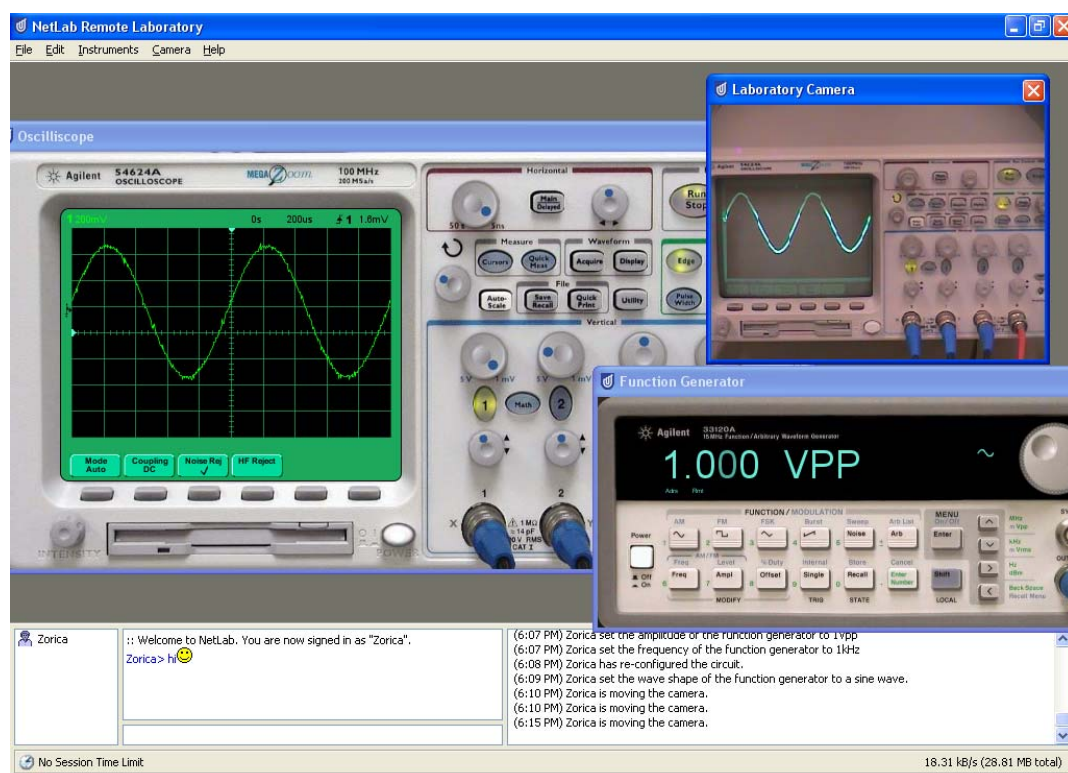


Figure 6. NetLab GUI.

If you have problems using NetLab, please first go to "Get Help" and try to correct problem yourself. If you are unsuccessful, ask your friends from the class, or post a question on the ECT discussion board (questions and answers) or send the course coordinator an e-mail (Zorica.Nedic@unisa.edu.au).

Experiment 1

1. Position the camera to see the oscilloscope (CRO) in the lab. From the **Instruments** library select Oscilloscope. Switch ON the oscilloscope GUI to compare its display with the display shown by the web camera.
2. Select the Circuit Builder from the **Instruments** library. Connect the function generator in series with a $1\mu\text{F}$ capacitor and a 100Ω resistor. Connect CRO channel 1 across function generator and CRO channel 2 across the resistor as shown in Figure 7. For this circuit you will need to drag and drop the required components and then use the left mouse button to wire them together. Press Configure button to make connections. Save the image of the circuit to include it in your report.

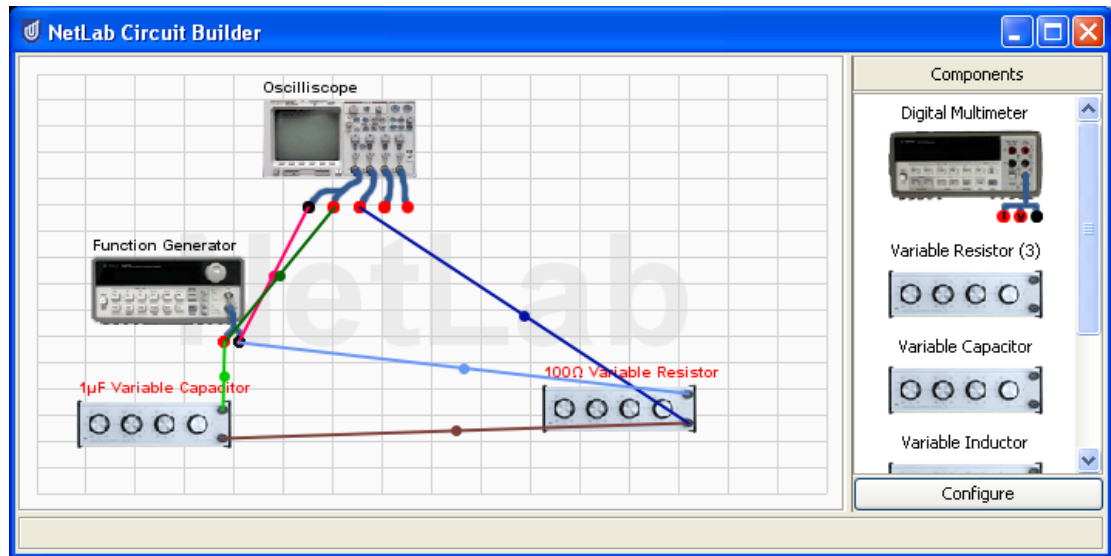
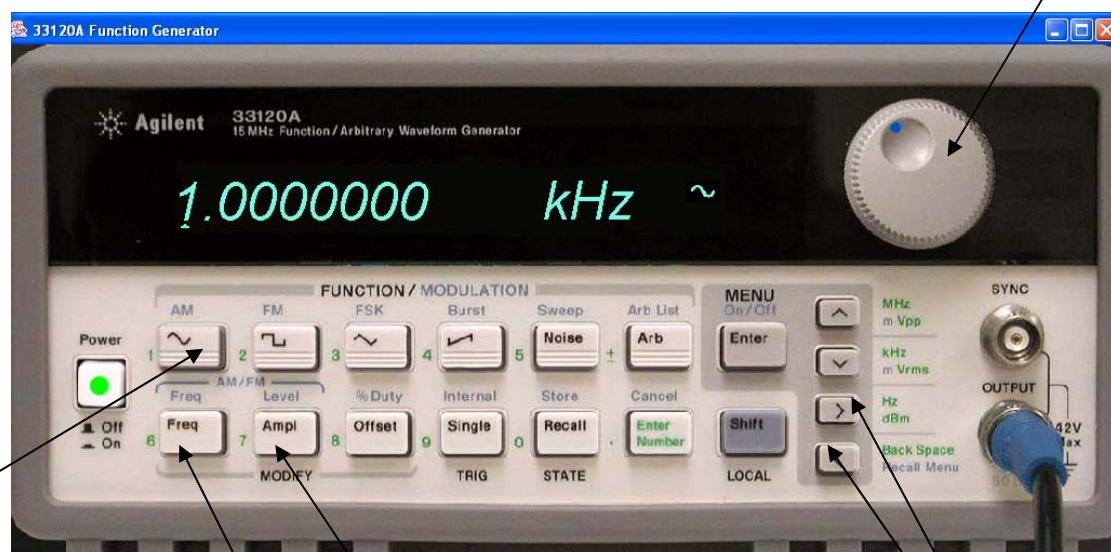


Figure 7 Circuit wired in Circuit Builder

3. Select the Function Generator from the **Instruments** menu. Adjust the input voltage to sine-wave of 1Vpp and frequency of 2kHz.



Press to select sine-wave

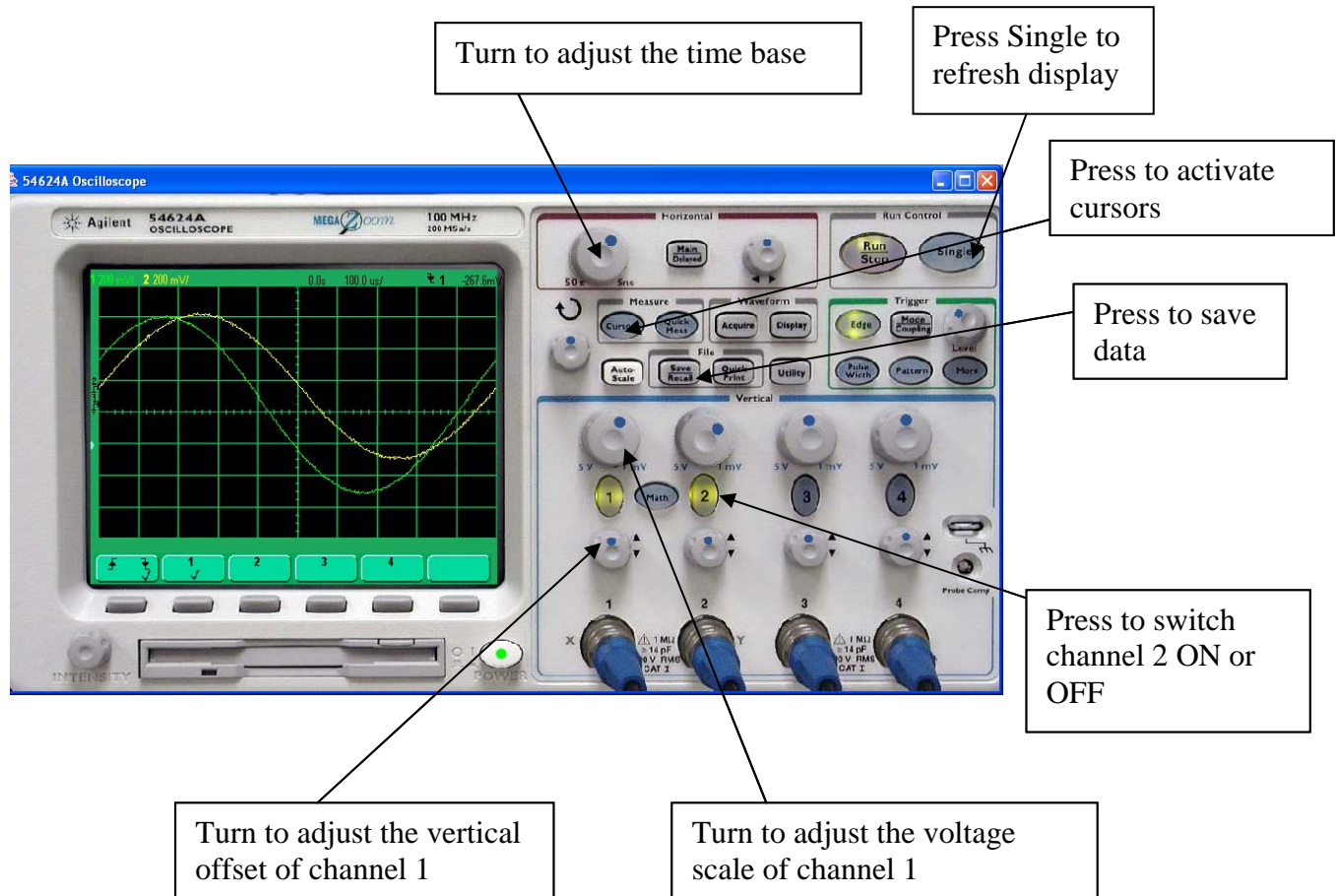
Press to select frequency

Press to select amplitude

Turn to adjust frequency or amplitude value

Press to move the pointer under active digit

4. Select the Oscilloscope from the **Instruments** menu. Switch it on. Turn on channels 1 and 2 and turn off channels 3 and 4.



5. Adjust the time base and the sensitivity of the voltage (vertical) axis for both channels (1 & 2) to obtain the largest possible view of 1-2 cycles of the signals.
 - Determine the phase angle between the signals. For this, you can use CRO cursors or you can save signals of both channels and upload them into MATLAB. Ideally, you would do both.
 - Disconnect the circuit and log off from NetLab.
6. In the report,
 - Draw the circuit diagram
 - Calculate the circuit current (phasor)
 - Calculate the voltage (phasor) across the 100Ω resistor
 - Compare the measured phase angle with the calculated value
 - Describe the method used to determine the phase angle from the measured results.
 - Advanced Q: can you calculate the actual value of the capacitance ($1\mu\text{F}$ is a nominal value and is not the exact value).
7. Submit a group report via AssignIT. Only one student from the group should submit the report. It is compulsory for all students in the group to sign the group report cover sheet. Also include the assessment feedback sheet with names of all students' in your group.