

PH2150 – LabVIEW and Data Acquisition Overview

Overview: This course is designed to introduce students to the National Instruments LabVIEW (v10.0) control and data acquisition program and to the use of analogue to digital converters (ADCs). There are six lab sessions with work expected outside of this time.

In the first two course sessions students will follow a tutorial on using LabVIEW and design a simple Virtual Instrument (VI) to display simulated temperature data.

The third and fourth sessions will see students using a pre-written LabVIEW VI to take data from a signal generator, using an ADC, to investigate some of the limitations of ADCs. Use will be made of the LabVIEW signal analysis VIs.

During the final two sessions students will be given template VIs for a State Machine and Function Generator. You will be expected to make these VIs work and to enhance their function, whilst maintaining good style and adding documentation.

Objective: To develop LabVIEW programs; to use an ADC and understand its limitations.

Learning Outcomes: Understanding the scope of LabVIEW; understanding ADCs and their limitations; using LabVIEW for data acquisition, control and data analysis.

Assessment: This lab session will be assessed as follows: 35% on a written report containing the work and conclusions on ADCs; 65% on VIs written and emailed to the module leader. The VIs submitted should be the improved template VIs you are given in the final two sessions of the course. Email your work you wish to be assessed (please **ZIP** it!) to G.Boorman@rhul.ac.uk

Students will need to copy the following files from the *PH2150* webpage to a directory within their home directory. Make a directory *yourhomearea/PH2150/* to contain the downloaded VIs and the VIs you write for the course.

'thermo input.vi' - this generated simulated thermocouple data.

'read usb6008.vi' - this runs the ADC card and takes data from it.

Labview can be started from '*all programs»academic application»physics»LabVIEW 2010»National Instruments LabVIEW 2010*'.

Students will use a USB-6008 DAQ box and a signal generator in the third session – connect this to the ADC using the 4mm to bare-end wires. Check with the demonstrators if you've any doubts about your wiring abilities!

A Datasheet for the USB DAQ box can be obtained from the NI website.

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IMPORTANT

The LabVIEW software is only licenced to be used on PCs within the Physics department. It is not available in the Computer Centre or any other PC in the college.

You may, for your own use, download a trial version of the latest version of LabVIEW from the NI website (30-day trial), but you **MUST** save any VIs you submit for marking in the LabVIEW 2010 format. Anything submitted in LabVIEW 2011 **will not be marked!**

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Useful websites

www.ni.com/labview *National Instruments, the designers of Labview, have a very useful site dedicated to Labview*