Workshop on Computer Interfaced Science Experiments

Science experiments generally involve measurement/control of physical parameters like temperature, velocity, acceleration, voltage, current etc. The conventional method is to use a dedicated setup for each experiment. A more economic and flexible approach is to interface these sensor and control elements to a computer and sequence the experiment using software. This also has the added advantage of collecting large amount of experimental data at precise time intervals, its analysis and display. This is the method followed by research labs all over the world. Educational institutions in India are still following the conventional method, except for some like IISERs and IITs, mainly due to lack of availability of equipment made in India. Such equipment is available from vendors like Pasco, Vernier and PhyWe, but are very expensive.

Inter-University Accelerator Centre, New Delhi, a particle accelerator lab under UGC, has taken a small step in changing this scenario as a part of their outreach program. Under this program, IUAC develops and promotes computerized lab equipment. The designs are open sourced. ExpEYES (Experiments for Young Engineers and Scientists) is a hardware and software framework to implement science experiments in an inexpensive manner. In simple technical terms, ExpEYES is device that can generate/measure analog/digital voltage signals as a function of time. But this basic functionality is enough to make it **capable of carrying out the functions of an oscilloscope, voltage source, frequency counter, arbitrary waveform generator etc. A large number of experiments at the undergraduate level have been performed and documented** for this. GUI programs are available for a large number of experiments, and new experiments can be developed easily by adding more sensor elements and coding in Python.

A training program on ExpEYES covers a set of experiments that the participants can perform with their own laptops after connecting the device to the USB port. It also covers a little bit of the design details and Python programming so that the participants learn how to develop new experiments in a cost effective and eco-friendly manner.

Documentation on ExpEYES is available for self learning. More details are on the website www.expeyes.in and the user manual can be downloaded from http://expeyes.in/Documents/eyes17-a4.pdf

| bpajith@gmail.com |