

Semester-I, Paper-4
VIRTUAL INSTRUMENTATION

Teaching Scheme

Lecturers: 4 Hrs / week
Practical: 2 Hrs / week

Examination Scheme

Theory: 100 marks
Term work: 25 marks

Unit 1.

(10 Hrs, 20 Marks)

Review of Virtual Instrumentation, Historical perspective, Need of VI, Advantages of VI, Define VI, block diagram & architecture of VI, data flow techniques, graphical programming in data flow, comparison with conventional programming.

Unit 2.

(10 Hrs, 20 Marks)

Programming Techniques, VIS & Sub VIS, loops & charts, arrays, clusters, graphs, case & sequence structures, formula modes, local and global variable, string & file input.

Unit 3.

(10 Hrs, 20 Marks)

Data Acquisition basics, ADC, DAC, DIO, Counters & timers, PC Hardware structure, timing, interrupts, DMA, Software and Hardware Installation.

Unit 4.

(10 Hrs, 20 Marks)

Common Instrument Interfaces for Current loop, Rs 232C/Rs 485, GPIB, System basics, interface basics: USB, PCMCIA, VXI, SCXI, PXI etc, networking basics for office & industrial application VISA & IVI, image acquisition & processing, Motion Control.

Unit 5.

(10 Hrs, 20 Marks)

Use of Analysis Tools, Fourier transforms, Power spectrum, Correlation methods, windowing & flittering. Application of VI: Application in Process Control Designing of equipments like Oscilloscope, Digital Millimeter using Lab view Software, Study of Data Acquisition & control using Lab view Virtual instrumentation for an Innovative Thermal Conductivity Apparatus to measure the Thermal Conductivity Apparatus- to measure the conductivity of non Newtonian fluids white they are subjected to sharing force.

References

1. Labview Graphical Programming, "Gary Johnson", second edition, MC GrawHill, Newyork, 1997
2. Labview for everyone, "Lisa K. Wells & Jettrey Travis", Prentice Hall, New Jersey, 1997.
3. Basic Concepts of Labview 4, "Sokoloff", Prentice Hall, New Jercy, 1998.
4. PC interfacing for Data Acquisition & process control, "S. Gupta, J.P.Gupta", second Edition, Instrument Society of America, 1994.

List of Experiments:

The term work shall consist of Application designing using Labview graphical programming.

1. Data Acquisition using Virtual Instrumentation from Temperature transducer.
2. Data Acquisition using Virtual Instrumentation from a Pressure Transducer
3. Creation of a CRO using Virtual Instrumentation.
4. Creation of a Digital Multi-meter using Virtual Instrumentation.
5. Design Variable Function Generator Using Virtual Instrumentation.
6. Creation of Digital Temperature Controller using Virtual Instrumentation.
7. Machine Vision concepts using Virtual Instrumentation