Course Number and Name

BEI704 - Virtual Instrumentation

Credits and Contact Hours

3 and 45

Course Coordinator's Name

Ms R.Abinethri

Text Books and References

TEXTBOOKS:

1. Gary Johnson, Lab VIEW Graphical Programming, Second edition, McGraw Hill, Newyork, 1997.

2. Lisa K. wells & Jeffrey Travis, Lab VIEW for everyone, Prentice Hall, New Jersey, 1997.

REFERENCES:

1. Kevin James, PC Interfacing and Data Acquisition: Techniques for Measurement, Instrumentation and Control, Newness, 2000.

Course Description

- To provide knowledge on design of process control by using virtual instrumentation techniques
- To provide knowledge in process analysis by VI tools.
- To give basic knowledge in describing function analysis.
- Get adequate knowledge VI tool sets

Prerequisites	Co-requisites
Electronic Instrumentation	NIL

required, elective, or selected elective (as per Table 5-1)

Selected elective

Course Outcomes (COs)

CO1: To describe about virtual instrumentation.

CO2: Get adequate knowledge VI tool sets

CO3: To describe data acquisition

CO4: To get introduced to VI programming techniques

CO5: To understand VI programming techniques

CO6: To get an adequate knowledge application of virtual instrumentation

Student Outcomes (SOs) from Criterion 3 covered by this Course

COs/SOs	a	b	c	d	e	f	g	h	i	j	k
CO1	M	M	M	H	M		M			L	L
CO2	H	M	M	H	H		M			L	L
CO3	H	M		H	H		M			L	L
CO4	H	M		H	H		M			L	L
CO5	H	M	M	H	H		M			L	L
CO6	H			H	H		M			L	L

List of Topics Covered

UNIT-I INTRODUCTION **9**

Virtual Instrumentation: Historical perspective - advantages - block diagram and Architecture of a virtual instrument - Conventional Instruments versus Traditional Instruments - data-flow techniques, graphical programming in data flow, comparison with conventional programming.

UNIT-II VI PROGRAMMING TECHNIQUES **9**

VIs and sub-VIs, loops and charts, arrays, clusters and graphs, case and sequence Structures, formula nodes, local and global variables, State machine, string and file I/O, Instrument Drivers, Publishing measurement data in the web.

UNIT-III DATA ACQUISITION **9**

Introduction to data acquisition on PC, Sampling fundamentals, Input/output techniques And buses. Latest ADCs, DACs, Digital I/O, counters and timers, DMA, Software and Hardware installation, Calibration, Resolution, Data acquisition interface requirements – Issues involved in selection of Data acquisition cards – Data acquisition cards with serial Communication - VI Chassis requirements. SCSI, PCI, PXI system controllers, Ethernet Control of PXI. Networking basics for office & Industrial applications, VISA and IVI.

UNIT-IV VI TOOLSETS **9**

Use of Analysis tools, Fourier transforms, power spectrum, correlation methods, Windowing and filtering. Application of VI in process control designing of equipments like oscilloscope, Digital multimeter, Design of digital Voltmeters with transducer input Virtual Laboratory, Web based Laboratory

UNIT-V APPLICATIONS **9**

Distributed I/O modules- Application of Virtual Instrumentation: Instrument Control, Development of process database management system, Simulation of systems using VI, Development of Control system, Industrial Communication, Image acquisition and processing, Motion control. Development of Virtual Instrument using GUI, Real-time systems, Embedded Controller, OPC, HMI / SCADA software, Active X programming.