GUJARAT TECHNOLOGICAL UNIVERSITY

M.E – Instrumentation and Control Engineering

(Applied Instrumentation)

Semester: II

Subject Name: **Virtual Instrumentation**

Sr. No.	Course content
1.	Problem Solving: Software development method, Scenario, Design, Implementation, Testing, Maintenance.
2.	Introduction to LabVIEW : Virtual Instruments, Parts of VI, Project explorer, Front panel and block diagram window, Creating simple VI
3.	Troubleshooting and Debugging VIs: Help utilities, Broken VIs, Debugging Techniques, Undefined or Unexpected data, Error checking and error handling
4.	Implementing VI: Front panel design, Data types, Documenting code, while and for loops, timing a VI, iterative data transfer, plotting data, case structures, arrays, clusters, type definitions, high and low level file I/O, creating subVIs.
5.	Data Acquisition :Hardware, software, simulating a DAQ device, Measuring analog input, Generating analog output, counters, digital I/O
6.	Single loop and multiple loop architecture, parallelism, events, timing a design pattern, Communicating among multiple loops, Event programming,file formats, binary and TDMS files.
7.	Creating and distributing application
8.	A mini project in LabVIEW in any application area of Engineering including but not limited to data acquisition, instrument control, Digital Signal Processing, Image Processing and Embedded System.

Objectives:

After completing the course students should be able to –

1. Use LabVIEW to create data acquisition, analysis, and display applications
2. Use Express VIs to get started with application quickly
3. Create user interfaces with strip charts, graphs and buttons
4. Use the programming structures and data type that exist in LabVIEW
5. Use various editing and debugging techniques
6. Create and save VIs so it can be used as subVIs

7. Save data in files
8. Create applications that use plug-in data acquisition (DAQ) boards
9. Create applications that use GPIB and serial port instruments
10. Design and implement stand-alone applications using LabVIEW
11. Create logical, re-usable applications that conform to accepted programming design standards
12. Create network based system to take advantage of network technologies for data exchange
13. Create customized file input/output formats to match data

Components required:

- LabVIEW Professional Development System Version 7 or higher
- E-Series DAQ board
- IEEE 488.2 (GPIB) board (for experiment 9)
- DAQ Signal Accessory
- NI Instrument Simulator

Reference Books:

1) National Instruments course manual of Basics I : Introduction course & Basics II : Development course manual
2) Virtual Instrumentation Using LabVIEWS, Sanjay Gupta & Joseph John, Tata Mcgraw-Hill
3) LabVIEW Express Student Edition ,Robert Bishop, Prentice Hall
4) Applications in LabVIEW, Leonard Sokoloff, Prentice Hall
5) Digital Signal Processing System-Level Design Using LabVIEW, Nasser Kehtarnavaz, Newnes
6) LabVIEW Digital Signal Processing,Cory L.Clark, McGraw-Hill
7) Analog Electronics with LabVIEW,Kenneth Ashley,Prentice Hall
8) Advanced LabVIEW Labs,John Essick,Prentice Hall
9) Computer-Based Electronic Measurement: An introductory Electronics Laboratory Workbook Based on LabVIEW and Virtual Bench,A.Bruce Buckman, Prentice Hall