

VIRTUAL INSTRUMENTATION LABORATORY

V Semester: ECE

Course Code	Category	Hours / Week			Credits	Maximum Marks		
AECC30	Core	L	T	P	C	CIA	SEE	Total
		-	-	3	1.5	30	70	100
Contact Classes: Nil	Tutorial Classes: Nil	Practical Classes: 36			Total Classes: 36			

Prerequisites: Electronic Measurements and Instrumentation

I. COURSE OVERVIEW:

The Laboratory Virtual Instrument Engineering Workbench (LabVIEW) is a development environment designed by National Instruments that creates graphic-based programs and simulate actual laboratory instruments. The experimental objective of this lab is to design basic operations and data acquisition using myDAQ and myRIO's. Design, verify prototype models for electrical, electronic and mechanical applications using LabVIEW.

II. COURSE OBJECTIVES:

The Students will try to learn:

- I The concept of virtual instrumentation used to develop basic VI programs using loops, case structures for image, signal processing and motion control applications.
- II LabVIEW tool to design basic operations and data acquisition using myDAQ and myRIO's.
- III Prototype model for distribute stand-alone applications using LabVIEW.

III. COURSE OUTCOMES:

After successful completion of the course, students should be able to:

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|---|------------|
| CO 1 Demonstrate the Lab VIEW graphical programming environment for virtual instrumentation applications. | Understand |
| CO 2 Make use of single and nested -loop design patterns for implementing iterative operations in Lab VIEW. | Apply |
| CO 3 Apply cluster and frame based techniques on data for collective and distributive data application. | Analyze |
| CO 4 Demonstrate the mathematical operations on waveforms using Lab VIEW for signal processing and communication applications. | Apply |
| CO 5 Build data acquisition system for measuring physical parameters from the transducers. | Understand |
| CO 6 Test, control performance parameters of Electrical motors using My DAQ and My RIO. | Analyze |

IV. COURSE SYLLABUS:

Week – 1: OPEN AND RUN A VIRTUAL INSTRUMENT

Open the front panel and block diagram in Lab VIEW software

Week-2: SUM OF „n“ NUMBERS USING „FOR“ LOOP AND WHILE LOOP FACTORIAL OF A GIVE NUMBER USING FOR LOOP AND WHILE LOOP

Design a program to find the sum of _n' numbers using FOR loop and WHILE loop

Design a program to perform the factorial of a given number using FOR loop and WHILE loop.

Week -3: BUNDLE AND UNBUNDLE CLUSTER

Design a program to bundle and unbundle a cluster.

Week-4: APPLICATION USING FORMULA NODE & DISCRETE COSINE TRANSFORM

Design a program to create a sine wave using formula node and to perform discrete cosine transform on the given signal.

Week-5: FLAT AND STACKED SEQUENCE

Design a program to perform functions using flat and stacked sequence.

Week-6: AMPLITUDE MODULATION

Design a program to perform Amplitude Modulation.

Week-7: REAL TIME TEMPERATURE MONITORING USING VIRTUAL INSTRUMENTATION.

Design a program for real time temperature monitoring by using virtual instrumentation

Week-8: MEASURE DISTANCE USING IR RANGER AND MYDAQ

Design a program for measure distance using ir ranger and myDAQ

Week-9: MEASUREMENT OF VIBRATIONS USING PIZEO ELECTRIC TRANSDUCER AND MYDAQ

Design a program for measurement of vibrations using pizeo electric transducer and myDAQ

Week-10: MEASUREMENT OF VIBRATIONS USING PIZEO ELECTRIC TRANSDUCER AND MYRIO

Design a program for measurement of vibrations using pizeo electric transducer and myRIO

Week-11: INTERFACE SERVO MOTOR AND DC MOTORS USING MYDAQ

Acquire the data from the sensors by using myDAQ and myRIO

Week-12: INTERFACE SERVO MOTOR AND DC MOTORS USING MYRIO

Design a program to interface servo motor and dc motors using myRIO

Week-13: MEASURE DISTANCE USING IR RANGER AND MYRIO

Design a program to develop signal generator by using myRIO cards

Week-14: DEVELOPING SIGNAL GENERATOR USING DAQ CARDS

Design a program to develop signal generator by using myDAQ cards

IV. REFERENCE BOOKS:

1. Jim Kring, Jeffrey Travis , "LabVIEW for Everyone: Graphical Programming Made Easy and Fun", Prentice Hall, 3rd Edition, 2006.
2. Richard Jennings Gary W.Johnson, "Labview Graphical Programming", McGraw-Hill Education, 4th Edition, 2011.
3. Rick Bitter, Taqi Mohiuddin,, Matt Nawrocki, "LabView: Advanced Programming Techniques", CRC Press, 2nd Edition, 2006.
4. Sanjay Gupta, "Virtual Instrumentation using LABVIEW", McGraw-Hill Education, 2nd Edition, 2010.

V. WEB REFERENCE BOOKS:

1. <http://www.ni.com/pdf/manuals/373427j.pdf>
2. <http://home.hit.no/~hansha/documents/labview/Introduction%20to%20LabVIEW.htm>
3. <https://www.pearsonhighered.com/samplechapter/0130153621.pdf>
4. <http://k12lab-support-pages.s3.amazonaws.com/lvbasichome1.html>