INSTRUMENTATION LABORATORY

VI Semester: ECE

Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
AEC109	Core	-	-	3	2	30	70	100
Contact Classes: Nil	Tutorial Classes: Nil	Practical Classes: 45				Total Classes: 45		

OBJECTIVES:

The course should enable the students to:

I. Recall the basic applications and theory of the LabVIEW graphical programming environment.
II. Determine the basic programming concepts in LabVIEW.
III. Understand different data acquisition system concepts.
IV. Develop real time applications using LabVIEW.
V. Design, implement, and distribute stand-alone applications using LabVIEW.
VI. Apply single and multiple-loop design patterns for application functionality.

COURSE LEARNING OUTCOMES (CLOs):

The students should enable to:

1. Open and run a virtual instrument
2. Basic arithmetic operations &boolean operations
3. Sum of „n" numbers using „for" loop & factorial of a give number using for loop
4. Sum of „n" natural numbers using while loop & factorial of a give number using while loop
5. Convert °c to °f, create a subvi
6. Array maximum and minimum
7. Analyzing and logging data by using wave form graphs
8. An bundle and unbundle cluster
9. Application using formula node & discrete cosine transform
10. Flat and stacked sequence
11. Data acquisition through virtual instrumentation
12. Developing voltmeter using daq cards
13. Developing signal generator using daq cards
14. Real time temperature control using virtual instrumentation.

LIST OF EXPERIMENTS

WEEK - l	**OPEN AND RUN A VIRTUAL INSTRUMENT**
Open the front panel and block diagram in Lab VIEW software	
WEEK-2	**BASIC ARITHMETIC OPERATIONS &BOOLEAN OPERATIONS**
Designing a program to perform Addition, Subtraction , Multiplication and Division operations, and Developing a program to perform AND, OR, NOT, NAND, NOR,XOR and XNOR operations using Lab VIEW	
WEEK-3	**SUM OF „n" NUMBERS USING „FOR" LOOP & FACTORIAL OF A GIVE NUMBER USING FOR LOOP**
Designing a program to find the sum of _n' numbers using FOR loop and Designing a program to perform the factorial of a given number using FOR loop.	

WEEK-4	**SUM OF „n‟ NATURAL NUMBERS USING WHILE LOOP & FACTORIAL OF A GIVE NUMBER USING WHILE LOOP**
Designing a program to find the sum of _n‘ natural numbers using WHILE loop and Designing a program to perform the factorial of a given number using WHILE loop.	
WEEK-5	**CONVERT °C TO °F, CREATE A SUBVI**
Designing the program to convert °C to °F and Create a SubVI	
WEEK-6	**ARRAY MAXIMUM AND MINIMUM**
Designing a program to find the maximum and minimum variable from an array.	
WEEK-7	**ANALYZING AND LOGGING DATA BY USING WAVE FORM GRAPHS**
Designing a program to analyze and logging the data.	
WEEK -8	**BUNDLE AND UNBUNDLE CLUSTER**
Designing a program to bundle and unbundle a cluster.	
WEEK-9	**APPLICATION USING FORMULA NODE & DISCRETE COSINE TRANSFORM**
Designing a program to create a sine wave using formula node and to perform discrete cosine transform on the given signal.	
WEEK-l0	**FLAT AND STACKED SEQUENCE**
Designing a program to perform functions using flat and stacked sequence.	
WEEK-l1	**DATA ACQUISITION THROUGH VIRTUAL INSTRUMENTATION**
Acquire the data from the sensors by using MY DAQ and MY RIO	
WEEK-l2	**DEVELOPING VOLTMETER USING DAQ CARDS**
Designing a program to Develop voltmeter by using DAQ CARDS .	
WEEK-l3	**DEVELOPING SIGNAL GENERATOR USING DAQ CARDS**
Designing a program to develop signal generator by using DAQ cards	
WEEK-l4	**REAL TIME TEMPERATURE CONTROL USING VIRTUAL INSTRUMENTATION.**
Designing a program for real time temperature control by using virtual instrumentation	

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.

Web References:

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

Course Home Page:

SOFTWARE AND HARDWARE REQUIRED FOR A BATCH OF 36 STUDENTS

HARDWARE: Desktop Computer Systems 36 nos

SOFTWARES: NI LabVIEW (2015 LV- 64bitWin Eng)

LIST OF EQUIPMENT REQUIRED FOR A BATCH OF 36 STUDENTS

S. No	Name of the Equipment	Range
1	NI myDAQ with required accessories and mini systems	Analog input ..... ±10 V, ±2 V, DC-coupled Audio input..... ±2 V, AC-coupled
2	NI myRIO	Analog Input..... ±5V
3	Qube inverted pendulum addon for myRIO	--
4	Connectors and cables	--
5	NI USRB 2901 bundle with required accessories and cables	--