Engineering Program

Specialization	Technology of remote industrial sensing and controlling
Course Number	20413141
Course Title	Human machine interface software
Credit Hours	2
Theoretical Hours	2
Practical Hours	0

Brief Course Description:

This course covers the basic of widely used environment for industrial and educational purposes, i.e. LabVIEW. It introduces student how utilize LabVIEW to build a complete   human machine interface for industrial measurement and control systems.

Course Objectives:

Upon the completion of the course, the student will be able to:
1- Introduce the basic of LabVIEW
2- Working with LabVIEW functions, Vis and environment
3- Introduce LabVIEW Programming concepts
4- introduce data capturing and analyses with LabVIEW

Detailed Course Description:

Chapter No.	Unit title	Content	Time Needed
1	INTRODUCTION	• What is LabVIEW • LabVIEW VIs • Starting LabVIEW • Creating a VI • LabVIEW Menus	1weeks
2	LABVIEW BASICS	• Opening a VI • Basic Math in LabVIEW—Using Functions • Programming Preview: While Loops • Dataflow Programming • Data Types and Conversions • Documenting VIs • Printing a VI • Saving Your Work • Closing a VI	1 weeks
3	LABVIEW MATH FUNCTIONS	• Introduction • Basic Math Functions • Trigonometric and Hyperbolic Trigonometric Functions • Exponential and Logarithm Functions • Boolean and Comparison Functions • Programming Preview: Debugging	1
4	MATRIX MATH USING LABVIEW	• Working with Matrices and Arrays in LabVIEW Extracting a Subarray from a Larger Array or Matrix • Adding Arrays • Transpose Array • Multiplying an Array by a Scalar • Matrix Multiplication • Element by Element Multiplication • Condition Number • Matrix Determinant • Inverse Matrix • Solving Simultaneous Linear Equations • Programming Preview: For Loops • DATA ACQUISITION WITH LABVIEW	3 weeks

		• Overview of Data Acquisition • Sensors, Signals and Signal Conditioning • Data Acquisition Hardware • Using LabVIEW to Collect Data	
5	DATA ACQUISITION WITH LABVIEW	Overview of Data Acquisition Sensors, Signals and Signal Conditioning Data Acquisition Hardware Using LabVIEW to Collect Data	2 weeks
6	GETTING DATA INTO AND OUT OF LABVIEW WITHOUT DATA ACQUISITION	Writing LabVIEW Data to a Spreadsheet File Writing LabVIEW Data to a Measurement File Reading a LabVIEW Measurement File Reading a Spreadsheet File in LabVIEW Using Spreadsheet Data to Initialize a Matrix Control 1	
7	GRAPHING WITH LABVIEW	Using Waveform Charts Using Waveform Graphs Modifying Graph Features Generating 1D Arrays for Graphing Putting LabVIEW Graphs to Work Using XY Graphs—2D Plotting 3D Graphing Getting Graphs onto Paper and into Reports	2
8	DATA ANALYSIS USING LABVIEW VIS	Basic Statistics Interpolation Curve Fitting Regression	2
9	PROGRAMMING IN LABVIEW	LabVIEW Programming Basics, Expanded Structures	2
10	ADVANCED MATH USING LABVIEW VIS	Working with Polynomials Differentiation Integration Spectral Analysis	2

Evaluation Strategies:

		Percentage	Date
1. Exams	**First Exam**	20%	/ /20__
	Second Exam	20%	/ /20__
	Final Exam	50%	/ /20__
2. Homework and Projects		10%	/ /20__
Total		100%	

Teaching Methodology:
- Lectures
- PowerPoint slides
- Term projects

Text Books & References:

Textbooks
LabVIEW for Engineers, Ronald W. Prentice Hall; 1 edition (January 11, 2011)
References