Course Syllabus

Fall ’15 - ME 102A – Introduction to Measurement Systems for Mechatronics

Lecture MW 1-2 PM 2040 VLSB Cory

Lab: Room 122 Hesse Hall

MTuWTh 2-5 PM

Syllabus

COURSE PREREQUISITES

Engineering 26, Mechanical Engineering C85, ME104, ME132 (Co-requisite) Electrical Engineering 40 or 100. Reading and Composition courses completed

COURSE OBJECTIVES

Introduce students to modern experimental techniques for mechanical engineering; provide exposure to and experience with a variety of sensors used in mechatronic systems, including sensors to measure displacement, velocity, acceleration and strain; examine the role of error and uncertainty in measurements and analysis; exposure to and experience in using commercial software for data acquisition and analysis; discuss the role and limitations of spectral analysis of digital data; provide experience in working in a team in all aspects of the laboratory exercises, including set-up, data collection, analysis and report writing. Give students a basis for communication problem-solving, writing and speaking. Teach students how to communicate effectively to various target groups, including those, such as managers, who may be outside of their field of study. Familiarize students with fundamentals of text editing, oral-communication, rhetorical skills.

DESIRED COURSE OUTCOMES

By the end of this course, students should: Know how to use, what can be measured with, and what the limitations are of the basic instruments found in the laboratory: oscilloscope, counter/timer, analog-to-digital converter; understand the relevance of uncertainty in measurements, and the propagation of uncertainty in calculations involving measurements; understand the physics behind the instruments and sensors used in the laboratory; know how to program effectively using LabVIEW for data acquisition and analysis; understand the use of spectral analysis for characterizing the dynamic response of an instrument; know how to write a summary laboratory report including review and edit text, based on specific measures of excellence in technical communication; demonstrate a working knowledge of some basic tools and professional responsibilities for technical communication; Deliver an effective, well structured, well articulated engineering abstract, report, and proposal both orally and in writing using standard library/literature search and referencing methodologies.

GRADING

- **5% Peer Evaluations**
- **15 % Homework**
- **20 % Midterm**
- **30 % Labs**
- **30 % Project**

Midterm is tentatively scheduled for October 28th during class.

INSTRUCTORS

	Faculty	Graduate Student Instructors		
Name	George Anwar	Harshil Goal	Mohamad Nokob	Shrikant Kshirsa
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Name	Marcel Kristal
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Date	Details
Wed Sep 2, 2015	Introduction to LabVIEW - Wednesday 5:30 - 7:00
Fri Sep 4, 2015	Introduction to LabVIEW - Friday 4:30 - 6:00
Mon Sep 7, 2015	Homework Assignment #1
Wed Sep 9, 2015	assignment for Wednesday, Sept. 9
Thu Sep 10, 2015	Lab Assignment #1: Attention to Details
Sun Sep 13, 2015	Reading Assignment #2
Fri Sep 18, 2015	Homework Assignment #2
Mon Sep 21, 2015	Lab Assignment #2 Introduction to LabVIEW
Thu Oct 8, 2015	Lab Assignment #3: Introduction to Resistance Measurement and Gaussian Distribut
Fri Oct 9, 2015	Homework Assignment #3
Thu Oct 29, 2015	Lab Assignment #4: Dynamic Signal Measurements, Sensors And Analog Signal Filter
Fri Oct 30, 2015	Homework Assignment #4
Wed Nov 11, 2015	Take Home Midterm
Mon Nov 16, 2015	Homework Assignment #5
	Reading Assignment #5
Tue Nov 17, 2015	Lab Assignment #5 PSOC as a DAQ
Mon Nov 23, 2015	Reading Assignment #6
Mon Nov 30, 2015	Lab Assignment #6: FFT, Nyquist, and Aliasing
Wed Dec 2, 2015	Homework Assignment #6
Thu Dec 10, 2015	Final Project
	Reading Assignment #1
	Reading Assignment #3
	Reading Assignments #4