

Syllabus

Instructor: Dr. Brian Reding

Office Hours: Th 2:30 -3:30 PM

Room: EC3254

Classroom: EC3270 / EC3275

Phone: 305-348-1806

Schedule: MW 2:30-4:45 PM

Email: breeding@fiu.edu

Textbook: No textbook is required for the course; instructions for the experiments are available on the class website as a downloadable PDF.

Objectives

1. To introduce students to instrumentation and measurement for engineering systems, which include:
 - a. Sensors and Measurement Transducers
 - b. Signal Amplifiers and Filters
 - c. Data Acquisition Hardware and Software
2. To acquaint students with the methods of experimental data analysis
3. To reinforce the students' technical communication skills and teamwork spirit.

Topics Covered

1. Introduction of Instrumentation and Measurement, Laboratory Safety, Writing Technical Reports
2. Temperature Measurement: Static Calibration and Dynamic Behavior of Thermocouples.
3. Force Measurement: Strain Gage and Wheatstone Bridge Circuits
4. Data Acquisition: Signal Sampling and Coupling, Experimental Data Analysis, Statistics Methods
5. Conditioning: Passive Filter Circuits
6. Amplification: Operational Amplifier Circuits
7. Infrared Imaging, Tachometer and Anemometer

Grading Policy

Reports	60%
Presentations	30%
Attendance	10%

A	95.0 – 100
A-	90.0 – 94.9
B+	86.7 – 89.9
B	83.3 – 86.6

B-	80.0 – 83.2
C+	76.7 – 79.9
C	73.3 – 76.6
C-	70.0 – 73.2

D	60 – 69.9
F	Below 60

Reports and Presentations: All reports and presentations have to be submitted electronically. Reports and Presentations should be submitted in PDF format, any other electronic formats will not be accepted. The file name of all files being submitted should be: EML3301L_Sect#_Exp#_Grp#.pdf (i.e.: EML3301L_U01_Exp1_Grp1) and add “PPT” to the end of presentations (i.e.: EML3301L_U01_Exp1_Grp1_PPT).

Any Experiment Not Attended Receives a Zero for the Report and the Presentation.

Missing 2 Experiments Results in Failure of the Course.

Being Absent for a Presentation, Results in a Zero for that Presentation.

Presentations or Reports Submitted Late Will Be Deducted 20 Points from the Final Overall Grade.

Incomplete Data for an Experiment or Not Turning in Shared Data in a Timely Manner will Result in a 50 Point Deduction from the Final Grade of that Report.

Tentative Schedule

Week	Topic
1	Introduction, Lab Safety, and Experimental Report
2	Experiment 1: Temperature Measurement
3	Experiment 2: Strain Gages and Presentation of Experiment 1
4	Experiment 3: Data Acquisition and Presentation of Experiment 2
5	Experiment 4: Passive Filters and Presentation of Experiment 3
6	Presentation of Experiment 4

Required Materials

Item	Recommended	Website	Item Number	Quantity
Thermocouple Reader	Omega UTC-USB	http://www.omega.com/	UTC-USB	1 per Group
Banana Plug Patch Cord	Stacking Banana Plug	http://www.grainger.com/	4WRF6	1 per Person
Banana Plug/ Alligator Clip Patch Cord	Banana/Alligator Clip Kit	http://www.grainger.com/	4WRF2	1 per person
Breadboard	Bread Board/Wire Kit	http://www.digikey.com/	1050-1012- ND	1 per group
BNC to Alligator	BNC to Alligator	http://www.digikey.com/	BKCC-21- ND	1 per person

Mechanical Engineering Program Objectives

ME Program Educational Objectives

1. A broad and in-depth knowledge of engineering science and principles in the major field of Mechanical Engineering for effective engineering practices, professional growth, and as a base for life-long learning.
2. Hands-on experience with available instruments and lab techniques to bridge classroom learning and practical, “real world” problems.
3. The ability to utilize analytical and experimental methods, along with modern computing techniques, in-order to effectively create engineering designs and to solve realistic engineering problems.
4. The ability to work effectively with others in a team, while simultaneously maintaining independent and creative thought.
5. The ability to communicate effectively and to articulate technical matters using verbal, written, and graphic techniques.
6. An adequate background to pursue graduate studies in engineering and other fields.
7. A sense of professional and social responsibility, including a commitment to protect both occupational and public health and safety, developed through the consideration of moral, social, and ethical paradigms related to the engineering profession and practice.

ME Program Outcomes

- A. The ability to apply knowledge of mathematics, science, and engineering.
- B. The ability to design and conduct experiments, as well as to analyze and interpret data.
- E. The ability to identify, formulate, and solve engineering problems.
- F. Understanding of professional and ethical responsibility.
- G. The ability to communicate effectively.
- I. Recognition of the need for and ability to engage in life-long learning.
- K. The ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.