

**MIAMI UNIVERSITY  
SCHOOL OF ENGINEERING AND APPLIED SCIENCE  
DEPARTMENT OF ENGINEERING TECHNOLOGY**

ENT 404	Experimentation Techniques for Engineering Technology	3
Course Number	Title	Credit Hours

**DESCRIPTION:**

This course provides coverage of experimentation techniques pertaining to engineering instrumentation and performance testing. This course will make use of laboratory experiments practical applications, problem based learning and case studies.

**PREREQUISITES:**

MTH 251 : Calculus-II

**TEXT MATERIAL:**

Beckwith, Thomas G., Marangoni, Roy D., and Lienhard V, John H. Mechanical Measurements 6<sup>th</sup> Edition Reading, MA: Addison-Wesley, 2007.

**COURSE OBJECTIVES:**

Upon completion of this course, the student should be able to:

- Plan and document experimental data.
- Understand the general characteristics of measurements
- Understand and specify mechanical measurements associates with temperature, pressure, strain, etc.
- Observe the dynamic behavior of measurement systems.

**METHOD OF EVALUATION:**

The student will be evaluated on homework problems, written laboratory reports a portfolio of your work., tests, and a final examination.

Portfolio and Homework	30%
Labs	30%
Tests	20%
Final exam	20%

**COURSE ASSESSMENT CRITERIA**

**Outcome 13** - “Fundamental knowledge of instrumentation used to measure parameters in fluid mechanics, heat transfer, and mechanical vibrations”

**Outcome 14** - “Fundamental knowledge of effective data presentation and technical report writing.”

**ASSESSMENT TOOLS USED IN ENT 404**

Employer Surveys  
Graduate Surveys  
Student Evaluations  
Design/Lab Projects and Tests from, ENT 415, ENT 497/498  
Instructor Course Evaluation Form from ENT 415, ENT 497/498

**MIAMI UNIVERSITY LEARNING COMMUNITY**

Miami University is committed to fostering a supportive learning environment for all students irrespective of individual differences in gender, race, national origin, religion, handicapping condition, sexual preference, or age. Students should expect, and help create, a learning environment free from all forms of prejudice. Disparaging comments, sexist or racist humor, or questioning the academic commitment of students based upon these individual differences are behaviors that undermine our learning community. If such behaviors occur in class, please seek the assistance of your instructor or department chair.

**(TENATIVE) TOPICAL OUTLINE:**

<b>Week</b>	<b>Subject</b>	<b>Chapter</b>	<b>Problems</b>	<b>Lab #</b>
1	Introduction and Course Planning			
2	Fundamentals of Mechanical Measurement	1	2	
3	Standards & Dimensional Units of Measurement	2	5,7	
4	Displacement & Dimensional Measurement	11	6	2
5	Strain & Stress: Measurement & Analysis	12	8, 15, <b>30</b>	10
6	Measurement of Force & Torque	13	6, 7, <b>10</b>	4
7	Practical Applications / Case Studies			3
8	Midterm			
9	Measurement of Fluid Pressure	14	25, <b>27</b>	7
10	Measurement of Fluid Flow	15	5, 29, <b>33</b>	6
11	Temperature Measurements	16	12, 16, <b>21</b> , 39, 40, 41	8
12	Problem Based Learning			1
13	Measurement of Motion	17	<b>4</b> , 5	9
14	Practical Application			5
15	Summary and Applications			11
16	Final Exam			

**LAB EXPERIMENTS**

<b>Lab #</b>	<b>Title</b>
1	Temperature Measurements
2	LVDT Measurements
3	Potentiometer Measurements
4	Strain Measurements
5	Non Destructive Testing (NDT) Measurements
6	Dead Weight Gage Calibration
7	LabVIEW
8	Manometer Measurements
9	Accelerometer Measurements
10	Poisson Ratio
11	Wind Tunnel Demonstration