

Fall 2019

ME 405-007: Mechanical Laboratory II

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Course Number	ME-405		
Course Title	Mechanical Laboratory II		
Course Structure	(1-2-2) (lecture hr/wk - lab hr/wk – course credits)		
Course Coordinator	Swapnil Moon		
Course Description	Laboratory emphasizes the use of fundamental principles, and instrumentation systems, for the analysis, and evaluation of mechanical components within a system.		
Prerequisite(s)	ME 343 – Mechanical Laboratory I ME 312 – Thermodynamics II		
Corequisite(s)	ME 407 – Heat Transfer		
Required, elective or selected elective	Required		
Required Materials	<p>a. J.P. Holman, <u>Experimental Methods for Engineers, Seventh Edition</u>, McGraw-Hill, 2001.</p> <p>b. Harnoy, A, <u>Mechanical Laboratory II Manual</u>, Available on ME Dept, NJIT Web</p>		
Other supplemental materials (not Required)	<p>c. Beckwith, Marangoni and Lienhard, <u>Mechanical Measurements</u>, Fifth Edition, Addison-Wesley, 1993.</p> <p>d. Beer, <u>A Guide to Writing as an Engineer</u>, 2nd Ed., Wiley ISBN 0-471-43074-9</p>		
Computer Usage	Lab report writing, data acquisition.		
Course Learning Outcomes/ expected performance criteria:	Course Learning Outcomes	SOs*	Expected Performance Criteria
	1. Test mechanical systems, such as pumps and turbines, in the laboratory	2, 7	Exam Question (75% of the students will earn a grade of 70% or better on this question)
	2. Compare measured transient heat transfer temperature to that calculated by the theory	1.2, 4, 7	Exam Question (75% of the students will earn a grade of 70% or better on this question)
	3. Apply theoretical concepts of	1.2, 4,	Exam Question (75%

	fluid mechanics, and thermodynamics to analyze the efficiency of pumps and turbines	7	of the students will earn a grade of 70% or better on this question)				
	4. Produce experimental graphs using computer data acquisition software.	1, 6	Report (70% of the students will earn a grade of 70% or better on the report)				
	5. Estimate experimental errors.	1, 2, 3, 7	Exam Question (75% of the students will earn a grade of 70% or better on this question)				
	6. Draw sketches explaining laboratory machine components,	2, 6, 7	Report (70% of the students will earn a grade of 70% or better on the report)				
	7. Write appropriate technical reports explaining experiments, results and draw conclusions	6	Report (80% of the students will earn a grade of 70% or better on the report)				
	8. Apply fluid mechanics concepts to analyze flow around a cylinder in wind tunnel experiments	1, 2, 4, 7	Exam Question (75% of the students will earn a grade of 70% or better on this question)				
Class Topics	Topics 1. Introduction to ME laboratory II 2. Performance test of a centrifugal pump. 3. Performance test of a gear pump. 4. Performance test of an impulse turbine (Pelton Wheel Experiment) 5. Wind tunnel experiment of pressure distribution around a cylinder 6. Transient heat conduction in bodies of finite length 7. Presentation/discussion of lab reports 8. Review.						
Student Outcomes (Scale: 1-3)	1	2	3	4	5	6	7
	3	3	2	2	2	2	3
	3 – Strongly supported 2 – Supported 1 – Minimally supported						

* Student Outcomes