

MECH3690 – Aerospace Engineering Laboratory

Course Code: MECH 3690	Course Title: Aerospace Engineering Laboratory
Required Course Or Elective Course: Required	Terms Offered (Credits): Spring, 3 credits
Faculty In Charge: Jinglei YANG	Co-Requisites: LANG 4034
Course Structure: 1. Lecture + Tutorial – 2 hours per week; 2. Laboratory – 4 hours per week (3 hours Lab + 1 hour technical report training LANG4034)	
Textbook/Required Material: AE Laboratory Manual	
Course Description: Fundamentals of instrumentation and measurement and their application in aerospace engineering testing and experimentation. Focuses primarily on application of the fundamental principles built in MECH1907, MECH2020, MECH2040, and MECH2210 to more advanced test and measurement applications, including principles of analog and digital data acquisition, analysis of discrete measurement data, statistical assessment of experimental data and uncertainty analysis, design of experiments, basic aerospace engineering experimental modules, and a comprehensive unmanned glider design project and competition.	
Course Topics: It is a laboratory course where students will learn AE-related experimental techniques and laboratory procedures, data acquisition, analysis, creative and innovative design of experiments.	
Course Objectives:	1. To introduce the basic understanding of physical measurements, the working principles of various transducers, and the knowledge of signal processing and data analysis. 2. To develop skills to design and analyze measurement systems. 3. To develop proficiency in data analysis, presentation and technical communication. 4. To provide a platform for practice in different engineering measurements. 5. To develop creative thinking and hands-on skills and team spirit for designing real unmanned glider for competition.
Course Outcomes:	A. Ability to identify the basic components of a measurement system. Familiar with common-used instruments. B. Ability to select proper transducers, conditioners and recorders for measurements. C. Ability to design, plan experiments and perform diagnosis.

	<p>D. Skill to select appropriate technique and instrumentation for the measurements of flow rate, velocity, motion, temperature, pressure, strain, force, etc.</p> <p>E. Proficiency in data analysis, presentation and technical communication.</p> <p>F. Skill to design, plan experiments and perform diagnosis through group work.</p>				
Assessment Tools:	<table border="0"> <tr> <td data-bbox="571 477 1246 510">In-class performance and/or mid-term and test</td> <td data-bbox="1281 477 1337 510">40%</td> </tr> <tr> <td data-bbox="571 521 1246 555">Technical Project Report and Glider Design Competition</td> <td data-bbox="1281 521 1337 555">60%</td> </tr> </table>	In-class performance and/or mid-term and test	40%	Technical Project Report and Glider Design Competition	60%
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