**MECH3690 – Aerospace Engineering Laboratory**

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<tr>
<th>Course Code: MECH 3690</th>
<th>Course Title: Aerospace Engineering Laboratory</th>
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<tr>
<td>Required Course Or Elective Course: Required</td>
<td>Terms Offered (Credits): Spring, 3 credits</td>
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<tr>
<td>Faculty In Charge: Jinglei YANG</td>
<td>Co-Requisites: LANG 4034</td>
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**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.
D. Skill to select appropriate technique and instrumentation for the measurements of flow rate, velocity, motion, temperature, pressure, strain, force, etc.
E. Proficiency in data analysis, presentation and technical communication.
F. Skill to design, plan experiments and perform diagnosis through group work.

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<th>Assessment Tools:</th>
<th>In-class performance and/or mid-term and test</th>
<th>40%</th>
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<tr>
<td></td>
<td>Technical Project Report and Glider Design Competition</td>
<td>60%</td>
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