

MECH3690 Aerospace Engineering Laboratories

Course Code: MECH3690		Course Title: Aerospace Engineering Laboratories													
Lecturer: Prof. Stephane REDONNET (Rm2577F)		TAs: Dr. Stanley LEUNG, Dr. Simon LI													
Terms Offered (Credits): Spring (3 credits)		Pre/Co-Requisites: Fundamental AE courses													
Course Structure: Lectures (~ 2 hours/week × 4 weeks); Experiment (~ 3 hours/week × 10 weeks, in two sessions)															
Textbook and Learning resources: ➤ Richard S. Figliola and Donald E. Beasley, 1995, Theory and Design of Mechanical Measurements, John Wiley & Sons ➤ Joseph E. Shigley and Charles R. Mischke, 1989, Mechanical Engineering Design, 5th. ed., McGraw Hill ➤ AE Lab manual from HKUST/MAE															
Course Description: This course provides a series of aerospace engineering hands-on laboratories, which are covered through both Lectures and Experiments. Lectures introduce the general information on how to design, perform and exploit experimental tests, along with some basic information pertaining to each experimental topic. Experiments include basic tests pertaining to flows and structures, along with more advanced tests relating to specific topics e.g. propulsion aerodynamics/aeroacoustics, aircraft design and flight dynamics (through a glider design competition). The course is targeted towards aerospace engineering students who have completed fundamental AE courses.															
Course Topics: <table><tr><td>1. Basic concepts and nomenclature</td><td>5. Venturi Flow</td><td>9. Aeroacoustics of Cavities</td></tr><tr><td>2. Design of experiments</td><td>6. Boundary Layer</td><td>10. Buckling & bending of structures</td></tr><tr><td>3. Data acquisition & Analysis</td><td>7. Fracture toughness</td><td>11. Turbojet Engine Performance</td></tr><tr><td>4. Stresses & strains</td><td>8. Vibrations</td><td>12. Glider design competition (experiential)</td></tr></table>				1. Basic concepts and nomenclature	5. Venturi Flow	9. Aeroacoustics of Cavities	2. Design of experiments	6. Boundary Layer	10. Buckling & bending of structures	3. Data acquisition & Analysis	7. Fracture toughness	11. Turbojet Engine Performance	4. Stresses & strains	8. Vibrations	12. Glider design competition (experiential)
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Course Objectives:	➤ To grasp the basic notions pertaining to experimental data acquisition and exploitation ➤ To perform basic hands-on experiments pertaining to aerospace engineering core subjects ➤ To learn how to document a scientific experiment through a technical report aligning with common engineering practices. ➤ To learn how to carry out experimental work in a safe and efficient manner, both independently and collaboratively as a team.														
Learning Outcomes:	✓ To grasp the fundamental concepts pertaining to aerospace through direct, hands-on experiments, ✓ To know how to properly design, conduct and exploit an experimental test, ✓ To become familiar with all engineering practices underlying testing and experiments, ✓ To know how to present experimental results in a proper way via a technical report, ✓ To develop investigative skills through Problem Based Learning and Laboratory activities, ✓ To be able to work as a team with individual tasks assigned.														
Assessment Method:	✓ Attendance & participation to labs (5%) ✓ Course quiz (15%) ✓ Lab performance + reports (80%)														
Academic integrity and learning environment: HKUST Academic Integrity : https://registry.hkust.edu.hk/resource-library/academic-integrity															