# ACGSC Presents a 1-Day Short Course
# Flight Dynamics of Rigid and Flexible Aircraft

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This one day short course is designed for graduate students and professionals with some familiarity with atmospheric flight dynamics, and who are interested in a rigorous refresher course and/or in gaining a better understanding of the effects of elastic degrees of freedom on flight dynamics. The material on flexible vehicles is presented from a "flight-dynamics" rather than a "structural-dynamics" perspective. Topics include:

1. The rigorous derivations of the equations of motion for rigid and flexible aircraft, Newton and Lagrange,
2. A review/tutorial on lumped-mass vibrations including rigid-body degrees of freedom,
3. Modeling the forces and moments on the vehicle, including the effects of static and dynamic elastic deformation,
4. Analysis of reference flight conditions – trim and control power,
5. Modal analysis of the small-perturbation vehicle dynamics (rigid and flexible),
6. Modal approximations and feedback stability augmentation,
7. Dealing with elastic effects in vehicle control (e.g., filtering, sensor and actuator placement),
8. Active structural mode control – a case study,
9. Examples involving a flexible hypersonic vehicle and a large flexible aircraft.

Topics and treatment will draw heavily from the instructor's new McGraw-Hill book *Modern Flight Dynamics* and copies of the book will be provided to course attendees. Additional course materials include electronic and hard copies of the lecture Powerpoint files. Breakfast and lunch are also included in the short course costs of $485.