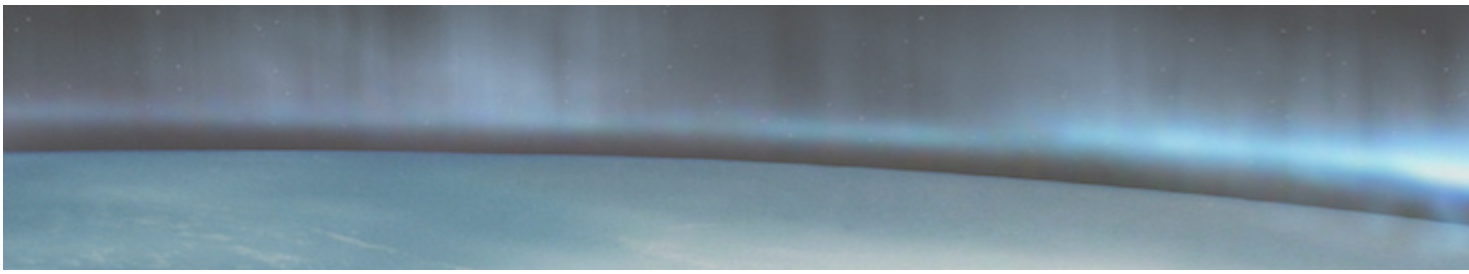
Kinetics: Studying Spacecraft Motion [1]



About This Course

As they tumble through space, objects like spacecraft move in dynamical ways. Understanding and predicting the equations that represent that motion is critical to the safety and efficacy of spacecraft mission development. Kinetics: Modeling the Motions of Spacecraft trains your skills in topics like rigid body angular momentum and kinetic energy expression shown in a coordinate frame agnostic manner, single and dual rigid body systems tumbling without the forces of external torque, how differential gravity across a rigid body is approximated to the first order to study disturbances in both the attitude and orbital motion, and how these systems change when general momentum exchange devices are introduced.

After this course, you will be able to...

- Derive from basic angular momentum formulation the rotational equations of motion and predict and determine torque-free motion equilibria and associated stabilities
- Develop equations of motion for a rigid body with multiple spinning components and derive and apply the gravity gradient torque
- Apply the static stability conditions of a dual-spinner configuration and predict changes as momentum exchange devices are introduced
- Derive equations of motion for systems in which various momentum exchange devices are present Please note: this is an advanced course, best suited for working engineers or students with college-level knowledge in mathematics and physics.

Language
English

How to Pass
Pass all graded assignments to complete the course.

User Ratings
Rated 5 out of 5 of 3 ratings

Level
Advanced

Commitment?
Best completed in 4 weeks, with a commitment of between 2 and 5 hours per week.

Who is this class for:

This class is for working engineering professionals looking to add to their skill sets, graduate students in engineering looking to fill gaps in their knowledge base, and enterprising engineering undergraduates looking to expand their horizons.

For More Information or to Enroll [2]

[2]

Created by:

University of Colorado Boulder

Groups audience:
Colorado Learning and Teaching with Technology
Right Sidebar:
MOOC Kinetics: Studying Spacecraft Motion

Links
[1] https://www.cu.edu/coltt/kinetics-studying-spacecraft-motion [2] https://www.coursera.org/learn/spacecraft-dynamics-kinetics