Orbital Mechanics I (ASTE580)

**Syllabus**

* Physical principles (Brahe, Kepler, and Newton)
* Coordinate systems and fundamental transformations
* Two-body and central force motion
* Orbital maneuvers
* Interplanetary trajectories
* The Rocket Equation
* Orbit propagation
* Keplerian elements versus position and velocity vectors in Cartesian coordinates
* Lambert’s Problem and an application to mission design
* Gravitational potential function for a distributed mass
* The n-body problem
* Measures of time and their relationships; What time is it in space?
* Orbital perturbations
* Generating ephemerides (locations of celestial bodies and spacecraft versus time) online and near-Earth asteroid encounters
* Satellite Orbit Paradox
* “Zero G”
* Maneuver design techniques
* Further study

Textbook: Gerald R. Hintz, Orbital Mechanics and Astrodynamics: Techniques and Tools for Space Missions, Springer, New York, 2015. ISBN 978-3-319-09443-4, ISBN 978-3-319-09444-1 (eBook)

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