SYLLABUS M E-452: Dynamics of Space Flight Fall 2016

Text: *Orbital Mechanics for Engineering Students*, H. D. Curtis (Elsevier, 2010) 2nd Edition
References: Additional materials will be e-mailed through the Highlander Pipeline during the semester

Week	Topic	Reading	Problems
1	Introduction and Review: Kinematics, Newton's Laws, Time derivative of moving vectors, relative motion	Chapter 1	1.1 – 1.10 1.12, 1.13, 1.15
2	Two Body Problem: Motion equations in an Inertial Frame; Relative Motion	2.1 - 2.3	
3	Review of Conic sections; Angular Momentum Orbital Energy	Electronic notes; 2.4, 2.5	
4	Derivation of Equations for Orbital Trajectories: Circular, Parabolic, Elliptic Hyperbolic Trajectories	2.6 – 2.9	2.1-2.3, 2.6, 2.7, 2.8, 2.11, 2.13, 2.15-2.18, 2.21, 2.22, 2.24, 2.30, 2.32 2.37, 2.38
5	***Exam 1***	2.10	
6	Perifocal Frame Restricted Three-Body Problem	2.10 2.11	2.26, 2.32, 2.35, 2.36 2.44, 2.45
7	Orbital Position as a Time Function: Time since Periapsis- Circular Elliptical Trajectories	3.1, 3.2 3.5	3.1, 3.4 - 3.10 3.14
8	Hyperbolic Trajectories Universal Variables	3.6 3.7	3.16 3.19
9	***Exam 2***		
10	Orbits in 3 Dimensions: State vector & Geocentric Frame Orbital Elements and State Vector	4.1 – 4.3 4.4	4.1, 4.2 4.4, 4.5
11	Coordinate Transformations Transformation: Geocentric Equatorial to Perifocal Frames	4.5 4.6	4.8 – 4.11 4.14 – 4.16, 4.19,
12	Effects of Earth's Oblateness	4.7	4.25, 4.26
13	***Exam 3***		
14	Preliminary Orbit Determination: Gibbs' Method Lambert's Problem	5.1, 5.2 5.3	5.1, 5.2 5.4, 5.5
	Review of Course Concepts		
15	***Final Exam***		

* Homework Problems will be assigned in class.