AOE 4134 ASTROMECHANICS

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Text:. Bate Mueller & White; *Fundamentals of Astrodynamics,* Dover Publications Inc. 1971

Grading:	**Two Tests**	**2.5**	**(42%)**
	Homework, etc	**1.5**	**(25%)**
	Final	**2**	**(33%)**
	Total	**6**	**(100%)**

Ground Rules : Students are encouraged to discuss homework together. However, the final effort MUST BE YOUR OWN. Assignments will be given on a quasi-weekly basis. The Honor code applies to all work.

Outline

1. Preliminaries
2. Two Body Problem
   - equations of motion
   - differential equation of the orbit
   - equation of the orbit
   - orbital properties
   - orbit in space - orbital elements
3. Orbit determination
   - coordinate transformations
   - two line element sets
4. Orbital Maneuvers
   - transfer
   - plane changes
5. Time Equations
6. Mission analysis
   - flyby and capture
   - patched conic approximations
7. Selected Problems (typically) - Lambert's problem, low thrust maneuvers, intercept & rendezvous - other suggestions?

REFERENCES

1. Vallado, *Fundamentals of Astrodynamics and Applications*, McGraw Hill, New York, 1997
   Has lots of additional information and algorithms

2. Geyling & Westerman, *Introduction to Orbital Mechanics,* Addison Wesley, 1971
   First Chapter applies to this course - Excellent book

3. Wiesel, *Spaceflight Dynamics,* McGraw Hill, 1989
   Has additional material regarding launch vehicles and satellites

4. Hale, *Introduction to Space Flight,* Prentice Hall, 1994
   A "by the numbers" book, lacks rigor

5. Chobotov, *Orbital Mechanics,* AIAA, 1996
   This book is ok for an AIAA book - lots of topics, probably better as a second book

6. Danby, *Fundamentals of Celestial Mechanics*, Macmillian, 1962,1989
   Excellent book

7. Kaplan, *Modern spacecraft Dynamics and Control*, John Wiley & Sons, 1976
   Has additional information about satellite attitude control

8. Roy, *Foundations of Astrodynamics*, Macmillan, 1961
   Fairly concise

9. Roy, Orbital Motion, Adam Hilger Ltd., 1978

10. Szebehely, *Theory of Orbits (The Three Body Problem)*, Academic Press, 1967
    Graduate level

11. Battin, An Introduction to the Mathematics and Methods of Astrodynamics, AIAA, 1987
    This is a "classic" but difficult to read at first.

12. Prussing and Conway, *Orbital Mechanics*, Oxford University Press, 1993