

Space Engineering
Preliminary Examination Topics

Specific topics are described in the textbooks indicated below each general topic area.

Orbital Dynamics (including material covered in AOE 5234):

Bate, Roger, Donald Mueller, and Jerry White; *Fundamentals of Astrodynamics*, Dover Publications, New York, NY, 1970.

Wiesel, *Spaceflight Dynamics*, 3rd Ed., Create Space, ISBN 1452879591.

Spacecraft Dynamics & Control

Hughes, Peter, *Spacecraft Attitude Dynamics*, John Wiley & Sons, Inc., New York, NY, 1986.

Particle and Rigid Body Dynamics (including material covered in AOE 5204):

Meirovitch, Leonard; *Methods of Analytical Dynamics*, McGraw-Hill, Inc., New York, NY, 1970.

Numerical Analysis (including material covered in AOE 4404):

Burden, R. L., and Faires, J. D., *Numerical Analysis*, Seventh edition, Brooks/Cole.

Chapra, Steven C. and Canale, Raymond P, *Numerical Methods for Engineers*, 7th Ed., McGraw-Hill, 2015.

Space Environment (including material covered in AOE 5174):

Chen, F.F., *Introduction to Plasma Physics and Controlled Fusion*, Springer, 2006.

Jian-Ming Jin, *Theory and Computation of Electromagnet Fields*, Wiley, 2010.

AOE PhD Preliminary Written Exam

Space Engineering

Fall 2016

This exam is open-book and open-notes. You *may* use mathematical software (e.g., Mathematica or Matlab) during the exam, but you may *not* use the internet. No communication of any type, implicit or explicit, concerning this exam is allowed during the test. The honor code will be strictly enforced.

Please answer four (and *only* four) of questions, as follows:

- Select and solve **one (1) of the first two (2)** problems, which focus on **orbital mechanics**.
- Select and solve **one (1) of the next four (4)** problems, which focus on **dynamics**.
- Select and solve **two (2) of the last four (4)** problems, which focus on **space engineering**.

Adhere to the following guidelines in preparing your solutions:

- Start each question on a *new sheet* of paper.
- Write only on the *front* of each page.
- *Write your name* at the top of each page.

Finally, complete and sign the honor code pledge below and submit this completed cover page with your solutions.

I pledge that this assignment has been completed in compliance with the Graduate Honor Code and that I have neither given nor received any unauthorized aid on this assignment

Signature _____

Printed Name _____