

ASTE 581 (Orbital Mechanics II) - Spring 2017

Course Syllabus

Instructor: Dr. Ryan Park

Class Location: RTH115

Time: Thursday, 6:40-9:20 PM

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Please include “ASTE581” in the subject.

Course Website: <https://courses.uscdcn.net>

Required Text

There is no required textbook for this class.

Prerequisites

ASTE 580 (Orbital Mechanics I)

Course Description

This course covers advanced concepts and methods applicable to practical and realistic astrodynamics problems. Topics include: the two-body problem, Hamiltonian and Lagrangian dynamics, Keplerian orbits, the N -body problem, the 3-body problem, planetary equations of motion, numerical integration, linear orbit theory, stability analysis, perturbation methods, oblateness and irregular shape, uncertainty propagation, and Monte-Carlo simulation. Other topics as time permits.

Grading

- Homework: 40%
- Project progress report: 10%
- Final project: 50%

Project

- There is no final exam in this course. Instead there is a final project.
- The project topic must be related to astrodynamics, e.g., mission design, maneuver design, navigation, etc.
- Each student must submit a project topic by 01/22/2017, Wed, (EOD) including the objective and proposed method.
- A project progress report is due on 03/01/2017.
- The final project report (including programs) is due on 04/26/2017. The report must be typed and is concise as possible. Font size 10 is preferred.

References

- Bate, R.R., Muller, D.D., White, J.E., *Fundamentals of Astrodynamics*, Dover Publications, New York, 1971.
- Battin, R.H., *An Introduction to the Mathematics and Methods of Astrodynamics*, AIAA Education Series, New York, 1987.
- Danby, J.M.A., *Fundamentals of Celestial Mechanics*, Willmann-Bell, Inc., 2003.
- Kaula, W., *Theory of Satellite Geodesy Applications of Satellites to Geodesy*, Dover, New York, 2000.
- Montenbruck, O., Gill, E., *Satellite Orbits*, Springer, New York, 2001.
- Prussing, J.E., Conway, B.A., *Orbital Mechanics*, Oxford University Press, Inc., New York, 1993.
- Roy, A.E., *Orbital Motion*, Institute of Physics Publishing, 1998.
- Vallado, D.A., *Fundamentals of Astrodynamics and Applications*, McGraw-Hill, New York, 1997.