AE 6506 AEROSPACE NAVIGATION AND GUIDANCE

Catalog Data: Aerospace Guidance and Navigation
3-0-3. Prerequisite: AE 3501 or equivalent.
Earth's shape and gravity; Introduction to inertial navigation; GPS aiding; Error analysis. Guidance systems; Analysis of the guidance loop; Estimation of Guidance variables. Adjoint analysis.

Textbook: Zarchan, P.; Tactical and Strategic Missile Guidance; 3rd Edn., AIAA, 1997

Coordinator: B.L. Stevens

Goals: This course will provide an understanding of inertial navigation, its error performance, and its integration with other avionics systems. Also, guidance techniques for aerospace vehicles will be studied, including a study of estimation and error analysis in a homing guidance loop.

	Topics	**Hours**
1.	Geodesy; coordinate frames; gravitation	2
2.	Principles of inertial navigation	6
3.	Strapdown inertial navigation	3
4.	Inertial sensors, navigation error analysis	4
5.	Aided inertial navigation (GPS aiding via Kalman filter)	5
6.	Guidance, using navigation information	3
7.	Guidance laws for different flight phases	3
8.	Homing guidance	4
9.	Estimation of guidance quantities	5
10.	Adjoint analysis of homing guidance	5
	Quizzes and Instructor's option	5
	Total	45

Computer Usage:

Digital simulation will be used as a tool to understand the behavior of nonlinear and time-varying guidance and navigation systems. Individual projects will be assigned.

Laboratory Projects:
None