Aerospace Engineering /College of Engineering

AerE 362 – Aerospace System Integration

Spring 2017 Syllabus

Instructor: Hanumanthrao Kannan, hkannan@iastate.edu
1620F Howe Hall
Class: Howe 2228, M/W/F, 1:10 pm-2:00 pm
TA: Robert Philpott, rophil3@iastate.edu

Course Information

Description
(3-0) Cr. 3. F.S. Emphasis on impact of component interfaces in aerospace systems. Understand how changes in variables associated with individual components impact the performance of the aerospace system. Specific integration challenges include: capturing implicit disciplinary interactions (e.g. structures/aerodynamics, propulsion/aerodynamics, etc.), propagating tolerances through the system (i.e. uncertainty modeling), balancing component attributes in the system objective.

Student Learning Outcomes/Objectives
By the end of the semester, the student should be able to:

- Understand how different components in an aerospace system interact;
- Understand how this interaction will impact the system performance objective and requirements;
- Describe system uncertainty based on various factors, including organizational, modeling, and component dimensioning and tolerances; and
- Apply disciplinary software tools to capture impacts of physics couplings on the system performance and requirements.

Prerequisite or Co-requisite

- Junior standing in Aerospace Engineering or permission of instructor.

Textbook

No required text – reference materials provided as needed

Grading Policy

Percentage	Description
20%	Homework
20%	Final Project/Final Exam
60%	Tests (3)

Letter Grade	Percentage	Performance
A to A-	90-100%	Excellent to Nearly Excellent Work
B- to B+	80-89.99%	Mostly Good to Very Good Work
C- to C+	70-79.99%	Mostly Average to Above Average Work
D to D+	60-69.99%	Poor to Below Average Work
F	0-59.99%	Failing Work

Topic Outline/Schedule

Date	Week		Topic	Assessment
1/9	1	M	Introduction to Aerospace Systems	**HW1**
1/11		W	Aerospace Systems and Components	
1/13		F	Aerospace Systems and Components	
1/16	2	M	University Holiday (MLK) – No Classes	**HW2**
1/18		W	Decomposition – Interfaces and Interactions	
1/20		F	Decomposition - DSM	
1/23	3	M	Decomposition - DSM	**HW3**
1/25		W	Systems Analysis	
1/27		F	Converging a System	
1/30	4	M	Systems Engineering	**HW4**
2/1		W	Mission Statement and Requirements	
2/3		F	Requirements Types	
2/6	5	M	Test #1	**Test 1**
2/8		W	Developing Requirements	
2/10		F	Requirements-based Design	
2/13	6	M	Requirements-based Design and Trade Studies	**HW5**
2/15		W	Requirements-based Design and Trade Studies	
2/17		F	Requirements-based Design and Trade Studies	
2/20	7	M	Optimization	**HW6**
2/22		W	Optimization	
2/24		F	Optimization	
2/27	8	M	Optimization	**HW7**
3/1		W	Optimization	
3/3		F	Optimization	
3/6	9	M	System Sensitivity Analysis – Trade Studies	**Test 2**
3/8		W	Test #2	
3/10		F	System Sensitivity Analysis – Trade Studies	
3/13	10	M	Spring Break – No Classes	
3/15		W	Spring Break – No Classes	
3/17		F	Spring Break – No Classes	
3/20	11	M	MDO/MDF	**HW8**
3/22		W	System Sensitivity Analysis – Trade Studies	
3/24		F	Impact of Couplings on System Performance	
3/27	12	M	Impact of Couplings on System Performance	**HW9**
3/29		W	Impact of Couplings on System Performance	
3/31		F	Origins of Uncertainty	
4/3	13	M	Modeling Uncertainty	**HW10**
4/5		W	Probability Theory	
4/7		F	Probability Theory	
4/10	14	M	Bayes Theory	**HW11**
4/12		W	Propagating Uncertainty	
4/14		F	Monte Carlo Simulation	
4/17	15	M	Project Work Day	**Test 3**
4/19		W	Test #3	
4/21		F	Project Work Day	
4/24	16	M	Project Work Day	**Project Presentations**
4/26		W	Project Competition/Presentation	
4/28		F	Project Competition/Presentation	
5/1 – 5/5			Finals Week	

Academic Dishonesty

The class will follow Iowa State University's policy on academic dishonesty. Anyone suspected of academic dishonesty will be reported to the Dean of Students Office. http://www.dso.iastate.edu/ja/academic/misconduct.html

Disability Accommodation

Iowa State University complies with the Americans with Disabilities Act and Sect 504 of the Rehabilitation Act. If you have a disability and anticipate needing accommodations in this course, please contact (instructor name) to set up a meeting within the first two weeks of the semester or as soon as you become aware of your need. Before meeting with (instructor name), you will need to obtain a SAAR form with recommendations for accommodations from the Disability Resources Office, located in Room 1076 on the main floor of the Student Services Building. Their telephone number is 515-294-7220 or email disabilityresources@iastate.edu. Retroactive requests for accommodations will not be honored.

Dead Week

This class follows the Iowa State University Dead Week policy as noted in section 10.6.4 of the Faculty Handbook http://www.provost.iastate.edu/resources/faculty-handbook.

Harassment and Discrimination

Iowa State University strives to maintain our campus as a place of work and study for faculty, staff, and students that is free of all forms of prohibited discrimination and harassment based upon race, ethnicity, sex (including sexual assault), pregnancy, color, religion, national origin, physical or mental disability, age, marital status, sexual orientation, gender identity, genetic information, or status as a U.S. veteran. Any student who has concerns about such behavior should contact his/her instructor, Student Assistance at 515-294-1020 or email dso-sas@iastate.edu, or the Office of Equal Opportunity and Compliance at 515-294-7612.

Religious Accommodation

If an academic or work requirement conflicts with your religious practices and/or observances, you may request reasonable accommodations. Your request must be in writing, and your instructor or supervisor will review the request. You or your instructor may also seek assistance from the Dean of Students Office or the Office of Equal Opportunity and Compliance.

Academic Issues

If you are experiencing, or have experienced, a problem with any of the above issues, email academicissues@iastate.edu.