Aerospace Engineering /College of Engineering

AerE 361 – Computational Techniques for Aerospace Design

Fall 2016 Syllabus

Instructor: ***Ambar K. Mitra, 2241 Howe Hall, 294-2694, akmitra@iastate.edu (Office Hours: MW 10:00-11:00)***

Class: ***Lecture at 0010 Hoover Hall, TTh 11:00-11:50***
Lab at 2344 Howe Hall, T 12:10-2:00, 2:10-4:00 and Th 2:10-4:00

Course Information

Description

(3-0) Cr. 3. Advanced programming, workstation environment, and development of computational tools for aerospace analysis and design. Technical report writing.

Student Learning Outcomes/Objectives

By completion of the course, students should be able to

- Work in the Linux/UNIX environment.
- Write, compile, link, and execute programs in FORTRAN90.
- Perform word processing by using LaTex.
- Solve systems of linear equations (Gauss elimination and LU decomposition) and interpret the meaning of condition number.
- Solve systems of non-linear equations by using Newton Raphson technique.
- Perform regression on a set of data and determine the squared summed residual error.
- Solve systems of ordinary differential equations by using the Runge-Kutta method.
- Use computational tools, such as, TechPlot, MATLAB, SolidWorks
- Write a code to solve determinate and indeterminate beam bending problems.
- Write a code to determine the lift-curve slope of an airfoil.

Prerequisite

- AerE 310, Math 267, EM 324, EM345

Web-Site

http://www.public.iastate.edu/~akmitra/aero361/design_web/

Topic Outline/Schedule

Week	Lecture	Lab	Assessment
1	Introduction to UNIX and FORTRAN	Introduction to UNIX and FORTRAN	
2	Gauss Elimination and LU Decomposition	Introduction to UNIX and FORTRAN	
3	Regression	Gauss Elimination and LU Decomposition	
4	Singularity Functions	Regression	
5	Beam Bending	Latex	Exam on Regression (10)
6	Beam Bending	Beam Bending	Exam on Latex (10)
7	Panel Method	Beam Bending	
8	Panel Method	Panel Method	Exam on Beam Bending (20)
9	Panel Method	Solid Works	
10	Panel Method	Solid Works	Solid Works (10)
11	Non-linear Eqns.	Panel Method	Exam Panel Method (20)
12	Simulink	Non-linear Eqns.	Exam on Non-linear eqns. (10)
13	ODE	Simulink	Simulink Exam(10)
14	ODE	ODE	
15	VB.net	ODE	

Grading Policy

Percentage	Description
50%	5 Exams; 10% each
10%	Final Exam (ODE)
40%	2 Major Projects; 20% each

Letter Grade	Percentage
A	92-100%
A-	89-91%
B+	86-88%
B	81-85%
B-	79-80%
C+	76-78%
C	71-75%
C-	69-70%
D+	66-68%
D	61-65%
F	0-60%

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.