King Fahd University of Petroleum and Minerals

Aerospace Engineering Department

AE 450 – Computational Methods in Aerospace Engineering

First Semester 2007-08 (072)

Instructor: Ahmad Jamal Office: 59-1048 Phone: 4637

Office Hours : 10:00 am – 10:50 am (Sat – Wed) Room 59-1048

Text Book : Lab Manual + Notes + Handouts

References :
1. Eduard L. Stiefel, ***An Introduction to Numerical Mathematics***, Academic Press Inc., 1966.
2. Richard L. Burden, J. Douglas Faires, ***Numerical Analysis***, 6th edition, ITP Books/Cole Publishing Company, 1997.
3. Peter Linz, Richard L. C. Wang, ***Exploring Numerical Methods: An Introduction to Scientific Computing Using MATLAB***, Jones and Bartlett Publishers, 2003.

Class Schedule : 22-224 U 2:10 – 5:10 pm

Course Contents :

Weeks	Approximate Topics
1 & 2	Introduction to Problem Solving Using a Computer Use of Excel
3 & 4	Learning and Application of Fluent Airfoil Applications
5-7	Introduction and use of MATLAB Matrices and vectors Matrix Operations Matrix Eigen values 2D Plotting Polynomials and Roots of Polynomials Systems of equations Complex Numbers
8-10	Ordinary Differential Equations Grid Generation Finite Difference Techniques Iteration Techniques Numerical Integration
11	Partial Differential Equations
12	Conformal Mapping
13	Statistical Analysis of Experimental Data
14	System Modeling and Control
15	Flight Trajectory

Grading Policy:

The final grade of the course will be based on quizzes, assignments, a term project, presentations, computer skills and attendance, and a final exam.

Arrangement of the Assignments:

Each assignment should be arranged to include:

- ***Cover Page***.
- ***Objective***: A brief introduction about the purpose and coverage of the assignment.
- ***Main Part of the Assignment***.
    - *Theoretical background*: Detailed information on the topic including text, figures, tables and equations.
    - *Given Data*: Detailed description of the given data with notations, symbols and appropriate units.
    - *Figures*: Every figure should have a caption and must be discussed in the text.
    - *Method of Solution*: Solution of the problem specifying the technique should be included.
    - *Computer Code*: The computer code developed to solve the problem should be included.
    - *Results (Values, Tables, Graphs)*: discussion of the solution and the results are also included in this part. Every table should carry a title and relevant explanation should be given in the text.
- ***Conclusions***: Brief summary of the achievements made.

Remarks:

1. Each assignment is due on or before the following week's period.
2. No late assignment submissions are acceptable.
3. Each assignment must be submitted as printed hard copy. The assignment should be typed using computer and MS word or any composing software. No hand written work is accepted. The accompanying program codes should be sent by email to the instructor.

Grading Policy :

Assignments	40 %
Quizzes	10 %
Final Exam	25 %
Term Project	10 %
Computer Skills	5 %
Attendance	10 %
Total	**100 %**

KFUPM Absence Policy :

A "DN" grade will be reported if unexcused absence exceeds 1/5 of the meetings or excused and unexcused absences are 1/3 of the meetings. Official valid excuse must be presented no later than a week after absence. Each absence without excuse results in a deduction of 1% out of the course final grade.