King Fahd University of Petroleum & Minerals
Department of Mathematical Sciences

MATH 321 (Term 141)

Course Syllabus

Course Instructor: Dr. Said Algarni

Recommended Text: "Numerical Analysis" by Richard L. Burden, J. Douglas Faires 9th (2011)

Main Topics to be Covered: Error analysis, Solutions of Nonlinear Equations, Solution of Linear Systems, Interpolation and polynomial approximation, Curve fitting, Numerical differentiation and integration, Introduction to solution of initial and boundary value problems for ordinary differential equations.

Course Objectives: This course is designed to provide an introduction to numerical methods for solving a variety of problems, linear and nonlinear and numerical approximation. In this course we focus on both: the theoretical and computational aspects.

Students Learning Outcome: After completion of the course, the students should

- be familiar with a variety of methods used to solve/approximate problems.
- be able to write computer programs to implement some numerical methods.
- be aware of the theoretical basis upon which these numerical methods are built.
- be aple to apply his knowledge in solving practical problems.

Computer Usage: Computer software is essential for this course. Mainly we will be using MATLAB as the computational platform.

General Information

- Grading Policy:
  - Homework, Assignments, Project 20%,
  - Majors I and II 40%,
  - Final 40% (The Final Exam is comprehensive)
- Office Hours:UTR, 08:00-09:50
- Office: 203-6 Building 5,
- Email: garnis at kfupm.edu.sa
- Web page: http://faculty.kfupm.edu.sa/MATH/garnis/
- **Note**: KFUPM attendance policy will be enforced. DN grade for 9 and more unexcused absences. Any student who comes within 5 minutes from the beginning of the class without excuse will be marked "L" and each two "L" will be counted as one absence.

Weekly Coverage of Course Material

Week	Date	Sec.	Topic	WH problems
1	Aug.31- Sep 04	1.2	Round-off Errors and Computer Arithmetic	
2	Sep. 07-11		MATLAB	
3	Sep. 14-18	2.1 2.2	The Bisection Method Fixed- Point Iteration	
4	Sep. 21-25	2.3	Newton's and Secant Methods	
(Eid Al- Adha Break) Sep. 26- Oct. 11				
5	Oct. 12-16		Tayler Series and Big"O' Truncation Error	
6	Oct. 19-23	3.1 3.3	Interpolation and the Lagrange Poly. Divided Differences	
7	Oct. 26-30	3.3 3.5	Divided Differences , Cubic Spline Interpolation	
First Major Exam				
8	Nov. 02-06	4.1	Numerical Differentiation	
9	Nov. 09-13	4.3 4.4	Element of Numerical Integration Composite Numerical Integration	
10	Nov. 16-20	5.1 5.2	The Elementary Theory of I.V.P. Euler' Methods	
11	Nov. 23-27	5.2 5.3	Euler' Methods Runge-Kutta Methods	
12	Nov 30- Dec.04	6.1 6.2	Linear systems of Equation Pivoting Strategies	
Second Major Exam				
13	Dec. 07 - 11	6.5	Matrix Factorization	
14	Dec. 14 - 18	7.3	The Jacobi and Gauss-Siedel Iterative Techniques	
15	Dec. 21 - 25	8.1	Discrete Least Squares Approximation	
16	Dec. 28	Normal Tuesday classes (Review)		
Final Exam is on Wednesday December 31, 2014 at 8:00 AM				