King Fahd University of Petroleum & Minerals
Department of Mathematical Sciences
MATH 471 Numerical Analysis I
Course Syllabus Term (132)

Course Instructor: Shehadeh, Yaqoub
Prerequisite: MATH 321 or CISE 301
Recommended Text: "Numerical Analysis" by Richard L. Burden, J. Douglas Faires 9th Ed, Brooks/Cole (2011)
References

I) Forsyth and Molar: Computer Solution of Linear Algebraic Systems.
II) Forsyth, Macolm and Molar: Computer Methods for Mathematical Computations

Course Objectives: This course is addressed to senior and graduate students of Sciences and Engineering to introduce the students to some of the more important topics of Numerical Linear Algebra including aspects of the theory by which its algorithms may be analyzed and to high-quality Numerical Software of Linear Algebra.

Catalogue Description: Floating point, round-off analysis. Solution of linear algebraic systems: Gaussian elimination and LU-decomposition, condition of a linear system, error analysis of Gaussian elimination, iterative improvement. Least squares and singular value decomposition. Matrix eigenvalue problems

Computer Usage: Computer software is essential for this course. Mainly we will be using Matlab as the computational platform. Other packages such as Maple may occasionally be used.

General Information

- The Final Exam is comprehensive
- Grading Policy: Homework and, Assignments 25%, Majors I and II 40%, Final35%
- Office Hours: Office: 302 Building 5,
- Email: shehadeh@kfupm.edu.sa
- **Note**: KFUPM attendance policy will be enforced. DN grade for 9 and more unexcused absences. Any student who comes after 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	Section	Topic
1	Jan26-Jan30	1.1	Round-off Errors and Computer Arithmetic
2	Feb2- Feb6	1.2-1.3	Round-off Errors and Computer Arithmetic
3	Feb9- Feb13	6.1 6.2	Linear systems of Equation Pivoting Strategies
4	Feb16-Feb20	6.3, 6.4 6.5	Linear Algebra and Determinant Matrix Factorization
5	Feb23-Feb27	6.6	Special Types of matrices
6	Mar2-Mar6	7.1 7.2	Norms of Vectors and Matrices Eigenvalues and Eigenvectors
7	Mar9-Mar13	7.3	The Jacobi and Gauss-Siedel Iteretive Technique
8	Mar16Mar20	7.4 7.5	Relaxation Techniques for Solving Linear System Error Bounds and Iterative Refinement
			Midterm Vacation
9	Mar30-Apr3	8.1	Discrete Least Squares Approximation
10	Apr6-Apr10	8.2	Orthogonal Polynomials and Least Squares Approximation.
11	Apr13-Apr17	9.1 9.2	Linear Algebra and Eigenvalues Orthogonal Matrices and Similarity Transformations
12	Apr20-Apr24	9.3	The Power Method
13	Apr27-May1	9.4	Householder's Method
14	May4-May8	9.5	The QR Algorithm
15	May11-May15	9.6	Singular Value Decomposition