جامعة الملك فهد للبترول والمعادن
King Fahd University of Petroleum & Minerals

KING FAHD UNIVERSITY OF PETROLEUM & MINERALS

DEPARTMENT OF MATHEMATICS & STATISTICS

Dhahran, 31261, Kingdom of Saudi Arabia

MATH 372: Quantitative Methods for Actuaries
Term 181

Instructor: Yaqoub Shehadeh
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Course Descriptions:

Algorithms; simplex and dual method; linear and quadratic programming; Solution of non-linear equations; finite differences; cubic splines; individual risk models; life tables. Floating-point arithmetic and error analysis. Interpolation. Polynomial interpolation. Numerical integration and differentiation. Data fitting. Solution of linear algebraic systems. Initial and boundary value problems of ordinary differential equations.

Credit: (3 – 0 – 3).
Note: Not to be taken for credit with Math 321 or CISE 301.
Prerequisite: MATH201 and either ICS 102 or ICS 103.

Textbook:

"Numerical Analysis" by Richard L. Burden, J. Douglas Faires 10th Ed, Brooks/Cole (2011)

Reference:

Bowers et. Al, ***Actuarial Mathematics***, SOA, 1997.

Grading Policy:

Assessment for this course is based on **class activities (attendance**, **homework** and **quizzes)**, **project**, ***two major (written) exams*** and a ***comprehensive final (written) exam***, as described in the following table:

Activity	Weight
Class Activities	15% (60 points)
Project	15% (60 points)
Major Exam I (Materials of Week 1 through Week 5) **Date: Sunday, October 7, 2018** **Time: TBA Location: TBA.**	20% (80 points)
Major Exam II (Materials of Week 6 through Week 10) **Date: Sunday , November 11, 2018** **Time: TBA.. Location: TBA.**	20% (80 points)
Final Exam (Comprehensive) **Date: December 19, 2018.** **Time: 7:00—10:00 PM. Location: TBA.**	30% (120 points)

Grading Scales:

Letter Grade	**A+**	**A**	**B+**	**B**	**C+**	**C**	**D+**	**D**	**F**
Range (in points)								>=220	

There is no quote on the number of students who can obtain "A+"!

Exam Questions:

- ❖ The questions of the common exams are based on the examples and the exercises of the textbook.

Attendance:

- ✓ ***Attendance*** on time is ***very*** important. Mostly, attendance will be checked within the ***first five minutes*** of the class. Entering the class after that, is considered as one late, and ***every two times late*** equals to one absence. In accordance with the University rules, ***"a grade of DN in a course is given if the student's unexcused absences are more than 20% of the lecture and laboratories sessions scheduled for the course"***. Therefore, students who accumulate **9**, or more, unexcused absences will receive the **DN** grade.

Academic Integrity: All KFUPM policies regarding **ethics** and **academic honesty** apply to this course.

Weekly Coverage of Course Material

Week	Section	Topic
1 Sep 2 – 6	1.2	Round-off Errors and Computer Arithmetic
2 Sep 9-13		MATLAB
3 Sep 16-20	2.1 2.2	The Bisection Method Fixed- Point Iteration
4 Sep 23-27	2.3	Newton's and Secant Methods
5 Sep 30-Oct 4	3.1 3.3	Interpolation and the Lagrange Polynomial Divided Differences
6 Oct 7 – 11	3.3 3.5	Divided Differences , Cubic Spline Interpolation
7 Oct 14 – 18	4.1	Numerical Differentiation
8 Oct 21 – 25	4.3 4.4	Element of Numerical Integration Composite Numerical Integration
9 Oct 28 – Nov 1	5.1 5.2	The Elementary Theory of I.V.P. Euler' Methods
10 Nov 4 –8	5.2 5.3	Euler' Methods Runge-Kutta Methods
11 Nov 11 – 15	6.1 6.2	Linear systems of Equation Pivoting Strategies
12 Nov 18 – 22	8.1	Discrete Least Squares Approximation
13 Nov 25 – 29	11.3	Finite-Difference Methods for Linera Problems
14 Dec 2 – 6	**	Standard Forms and Duality. Simlex Method
15 Dec 9 – 13	**	Standard Forms and Duality. Simlex Method