



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 322: Quantitative Methods for Actuaries

Term 171

Instructor: Yaqoub Shehadeh

Office: 5-302

E-mail: shehadeh@kfupm.edu.sa

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 9th 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 22, 2017 Time: TBA Location: TBA.	20% (80 points)
Major Exam II (Materials of Week 6 through Week 10) Date: Tuesday, November 28, 2017 Time: TBA.. Location: TBA.	20% (80 points)
Final Exam (Comprehensive) Date: January 03, 2018. Time: <u>8:00—11:00 AM.</u> 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 17 – 21	1.2	Round-off Errors and Computer Arithmetic
2 Sep 24 - 28		MATLAB
3 Oct 1 – 5	2.1 2.2	The Bisection Method Fixed- Point Iteration
4 Oct 8 – 13 + Oct 7	2.3	Newton's and Secant Methods
5 Oct 15 – 19	3.1 3.3	Interpolation and the Lagrange Polynomial Divided Differences
6 Oct 22 – 27	3.3 3.5	Divided Differences , Cubic Spline Interpolation
7 Oct 29 – Nov 2	4.1	Numerical Differentiation
8 Nov 5 – 9	4.3 4.4	Element of Numerical Integration Composite Numerical Integration
9 Nov 12 – 16	5.1 5.2	The Elementary Theory of I.V.P. Euler' Methods
10 Nov 19 – 23	5.2 5.3	Euler' Methods Runge-Kutta Methods
11 Nov 26 – 30	6.1 6.2	Linear systems of Equation Pivoting Strategies
12 Dec 3 – 7	8.1	Discrete Least Squares Approximation
13 Dec 10 – 14	11.3	Finite-Difference Methods for Linera Problems
14 Dec 17 – 21	**	Standard Forms and Duality. Simlex Method
15 Dec 24 – 28	**	Standard Forms and Duality. Simlex Method