

Jordan University of Science & Technology	
Faculty of Science and Arts	
Department of Mathematics and Statistics	
Year: 2006/2007	Semester: Summer

Course Information	
Course Title	Numerical Analysis 2
Course Number	MATH 421
Prerequisites	MATH321 and any programming language
Course Website	www.just.edu.jo/~towaiq/MATH421
Instructors	Dr. Mohammad Al-Towaiq
Office Location	PH3, CS Dept
Office Phone	7201000 Ext. 23661
Office Hours	Every day from 10:30 – 11:30 or by appointment
E-mail	towaiq@just.edu.jo

Text Book	
Title	Burden and Faires , "Numerical Analysis", 7th ed., Brooks/Cole, 2003
References	(1) Cheney and D. Kincaid , "Numerical Mathematics and Computing", 4 th ed., Brook/Cole, 1999. (2) Gregory and Redmond , "Introduction to Numerical Analysis", 1994. (3) K. Atkinson , "Elementary Numerical Analysis", 2nd ed., Wiley, 1993.

Assessment Policy		
Assessment Type	Expected Due Date	Weight
First Exam	Wed. 11 July, 07	20%
Second Exam	Wed. 1 Aug., 07	20%
Quizzes and HWs	TBA	10%
Project	TBA	10%
Final Exam	TBA	40%

Teaching & Learning Methods
<ul style="list-style-type: none"> • Class lectures, exams, project, and quizzes and home works are designed to achieve the course objectives. • You should read the assigned chapters before class and participate in class and do whatever it takes for you to grasp this material. Ask questions. Ask lots of questions. • You are responsible for all material covered in the class. • Please communicate any concerns or issues as soon as practical either in class, by phone or by Email.

Course Objectives
<p>"Numerical Analysis is the study of Algorithms for the problems of Science" [Crandall 1994]. The general objectives of this course are:</p> <ol style="list-style-type: none"> 1- To present most of the available numerical methods for solving problems with concentration on a sufficient number of methods to handle the problems likely to be encountered in practice. 2- To introduce students to the potentialities of modern computer for solving problems in science and technology. 3- To present a wide diversity of topics so that the student can see at once the immense range of applications for the subject. 4- At the end of this course, the students should be able to implement different numerical techniques to solve mathematical problems of linear algebra, eigenvalue problem, integration, and differential equations.

Course Content		
Chapter 4	Numerical Differentiation and Integration: Numerical Differentiation, Richardson's Extrapolation, Interpolatory integration, Romberg method, errors in quadrature formulae, Gaussian quadrature, multiple integrals.	1.5 weeks June 24 – July 3
Chapter 5	Initial Value Problems for Ordinary differential equations: Introduction. Euler, Taylor, and Runge-Kutta methods. Linear multistep methods. Stability. System of Differential Equations.	1.5 week July 4 - 12
Chapter 9	Eigenvalue problem: Introduction, Gershgorin's Circle Theorem, Power Method, QR Algorithm.	1.5 weeks July 15 - 24
Chapter 10	Numerical Solutions of Nonlinear Systems: Fixed point for Functions of Several Variables, Newton's Method.	1.5 weeks July 25 – Aug. 2
Chapter 12	Partial differential equations: Solution of a simple Elliptic, Hyperbolic, and Parabolic Partial differential equations.	1 week Aug. 5 - 9

Additional Notes	
Exams	<ul style="list-style-type: none"> The format for the exams is generally (but NOT always) as follows: Computation, analysis, and design. Grades will not be given out via e-mail. No unexcused missed exams will be accepted. All exams are closed-book exams. The final exam covers all the material in the course.
Quizzes	<ul style="list-style-type: none"> Quizzes (10-15 minutes) will be given on most Sundays at the end of the lecture. Typically they will involve simple questions that are designed to test the understanding of the material discussed in the preceding lectures. There will be 3 Quizzes. The highest 2 grades will be counted.
Makeup Exams	<ul style="list-style-type: none"> Let the instructor know about your makeup exam before 3 days prior to the scheduled exam time. Makeup exam should not be given unless there is a valid excuse.
Drop Date	<ul style="list-style-type: none"> Last day to drop the course is before Aug. 2, 07.
Cheating	<ul style="list-style-type: none"> Cheating or copying from neighbor on exam, project, or quiz is an illegal and unethical activity. Standard JUST policy will be applied.
Attendance	<ul style="list-style-type: none"> Excellent attendance is expected. JUST policy requires the faculty member to assign ZERO grade (35) if a student misses 10% of the classes that are not excused. Sign-in sheets will be circulated. If you miss class, it is your responsibility to find out about any announcements or assignments you may have missed.
Workload	<ul style="list-style-type: none"> Average work-load student should expect to spend is 6 hours/week.
Graded Exams	<ul style="list-style-type: none"> Instructor should return exam papers graded to students during the week after the exam date.
Participation	<ul style="list-style-type: none"> Participation in, and contribution to class discussions will affect your final grade positively. Raise your hand if you have any question. Making any kind of disruption and (side talks) in the class will affect you negatively.
Finally	<ul style="list-style-type: none"> Smoking is prohibited in all in-door places.