The University of Texas at Tyler
Electrical Engineering Bachelor of Science

EENG 4326 – Numerical Methods for Engineers

Syllabus

Catalog Description:
   A basic exploration of the numerical methods used in the solution and analysis of
   engineering problems. Focus will be given to linear systems, ordinary differential
   equations, and partial differential equations.

Prerequisites: MATH 3305 and successful completion of a structured programming
                 language course.

Credits: 3   (3   hours lecture,   0   hours laboratory per week)

Text(s):   Numerical Methods for Engineers, Chapra and Canale, McGraw-Hill, 6th. Ed.

Additional Material: Lecture Notes

Course Coordinator: Seyed Ghorshi

Topics Covered:
   Taylor Series; Root solution techniques; Matrix solution methods; Numerical
   Differentiation; Numerical Integrations; Romberg Methods; Optimization; Numerical
   Solution of Ordinary Differential Equations; Runge-Kutta Methods; Partial
   Differential Equations-Finite difference methods.

Evaluation Methods:
   1. Examinations / Quizzes
   2. Homework
   3. Reports
   4. Computer Programming
   5. Project
   6. Presentation
   7. Course Participation
   8. Peer Review

Course Objectives[1]: By the end of this course students will be able to:
   1. solve for the roots of complex equations by several techniques [1-3]
   2. solve systems of equations via matrix solution methods [1-3]
   3. Numerically determine finite integrals [1-3]
   4. numerically solve ordinary differential equations [1-3]
   5. numerically solve partial differential equations using the finite difference methods
      [1-3]
   6. program numerical methods into computers [3]
[1]*Numbers in brackets refer to method(s) used to evaluate the course objective.*

Relationship to Program Outcomes[2]: This course supports the following Mechanical Engineering Program Outcomes, which state that our students will be able to:

1. have the ability to apply knowledge of the fundamentals of mathematics, science, and engineering [1-6].
2. have the ability to use modern engineering tools and techniques in the practice of electrical engineering [1-6].
3. have the ability to analyze electrical circuits, devices, and systems [1-6].
4. have the ability to design electrical circuits, devices, and systems to meet application requirements [1-9].
5. have the ability to design and conduct experiments, and analyze and interpret experimental results.
6. have the ability to identify, formulate, and solve problems in the practice of electrical engineering using appropriate theoretical and experimental methods [6].
7. have effective written, visual, and oral communication skills [6].
8. possess an educational background to understand the global context in which engineering is practiced, including [2]:
   a. knowledge of contemporary issues related to science and engineering.
   b. the impact of engineering on society.
   c. the role of ethics in the practice of engineering.
9. have the ability to contribute effectively as members of multi-disciplinary engineering teams.
10. have a recognition of the need for and ability to pursue continued learning throughout their professional careers.

[2]Numbers in brackets refer to course objective(s) that address the Program Outcome.

Contribution to Meeting Professional Component: (in semester hours)

Mathematics and Basic Sciences:	1.0	hours
Engineering Sciences and Design:	2.0	hours
General Education Component:	0.0	hours

Prepared By:	Hassan El-Kishky	Date:	Jan. 5, 2010
	Seyed Ghorshi	Revised:	January 9, 2010
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The University of Texas at Tyler
Department of Electrical Engineering

EENG 4326: Numerical Methods for Engineers
2021 Fall Semester

COURSE OUTLINE

Course Coordinator:

> Seyed Ghorshi, PhD, Electrical Engineering
> Office: A215
> Phone: 903-566-6137
> E-mail: aghorshi@uttyler.edu

Class Location/Time:

> A218   11:15AM to 12:10PM MWF

Office Hours

> To be arranged then posted

Text

> Numerical Methods for Engineers, Chapra and Canale, McGraw-Hill, 6th. Ed.

Prerequisites

> MATH 3305

> MATLAB programming

Related subjects

(Tentative pending assignment -grader)	Grading rubric
Homeworks	30%
Computer Programming	10%
Midterm Exam	30%
Final Exam	30%

IMPORTANT: Please maintain a class folder with all your work including class notes, homework and lab assignments, quizzes, and mid-term exam. This folder should be submitted on the day of the final exam. It will be returned after the semester.

Please note that this is an **absolute requirement** and failure to submit a complete Student Course Folder will result in an **INCOMPLETE** grade for the course.

Course Content:
Taylor Series
Root solution techniques
Matrix solution methods
Numerical Differentiation
Numerical Integrations
Romberg Methods
Optimization
Numerical Solution of Ordinary Differential Equations
Runge-Kutta Methods
Partial Differential Equations-Finite difference methods.

Classroom Etiquette

Please remember to turn off cell phones before coming to class. Working on class assignments or surfing the web while class is going on is not acceptable. If these activities are important for you on a particular day it would be better you did them outside the class environment. That being said attendance is important and will taken periodically during the semester. If you know you have an emergency schedule conflict that comes up please inform me (email OK). Although I do not plan to integrate attendance data in with student evaluation it can and will provide additional information if a student is experiencing problems keeping up.

Background on grading and study habits

Typical ranges for grades in this class run as follows, 91-100% A, 80-90% B, 69% to 79% C. The class examples and HW problems provide a basis for gauging you comfort level with the material. The amount of time a student should study can not always be easily quantified due to differences between students. If after reviewing notes, book and HWs if you are having trouble digesting the concept or procedure involved you are highly encouraged to come to an office hour or make an appointment with me.

Advance Information on exams, quizzes

Not open book, limited equation reference allowed and provided. General policy is: you should get your questions answered before the day of exams. On exam day I will typically be involved with steps getting your exam ready. "needs of many outweigh needs of one "

Homework, MATLAB and HW Policy:

Regular homework assignments will be handed out and posted on Blackboard. Students will take quizzes at regular intervals corresponding to assignments. Solutions to the homework assignments will be made available through Blackboard. Students are encouraged to keep their own problem solving notebook and compare with the solutions after making as serious effort at solving the problem without review of the solution, Homework assignment when requested for turn in should be written as per the guidelines provided.

Academic Integrity:

Students should be aware that absolute academic integrity is expected of every student in all undertakings at The University of Texas at Tyler. Failure to comply can result in strong university-imposed penalties.

Note:

If you have a disability, including a learning disability, for which you request disability support services/accommodation(s), please contact Ida MacDonald in the Disability Support Services office so that the appropriate arrangements may be made. In accordance with federal law, a student requesting disability support services/accommodation(s) must provide appropriate documentation of his/her disability to the Disability Support Services counselor. For more information, call or visit the Student Services Center located in the University Center, Room 282. The telephone number is 566-7079 (TDD 565-5579)." Additional information may also be obtained at the following UT Tyler Web address: http://www.uttyler.edu/disabilityservices.

Grade Replacement Policy:

If you are repeating this course for a grade replacement, <u>you must file an intent to receive grade forgiveness with the registrar by the 12th day of class.</u> Failure to file an intent to use grade forgiveness will result in both the original and repeated grade being used to calculate your overall grape point average. A student will receive grade forgiveness (grade replacement) for only three (undergraduate student) or two (graduate student) course repeats during his/her career at UT Tyler. (2006-08 Catalog, p. 35)