

Course Information

Fall 2009

EGR 261 Signals and Systems

Pre-requisites: EGR 260, MTH 279

Credits: 3

Co-requisite: None

Lecture Hours: 3

Instructor: Paul Gordy

Office: H-115 (ATC) or Room 1117 (Tri-Cities Center)

Office Hours: as posted (will also be announced in class)

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Course Material:

1. Lecture Notes/PowerPoint Presentations - This is the primary source of information for this course. Material covered in lecture may not be found in the textbook. Students should print the PowerPoint presentations prior to class and use them to take notes as the presentations leave space for problems solved in class. If any lectures are missed, the student should try to copy the notes from another student.
2. Required textbooks
 - A) Nilsson & Riedel, ***Electric Circuits, 8th Edition***, Pearson Prentice Hall, 2008 (ISBN: 9780135142929).
 - B) Lathi, ***Linear Signals and Systems, 2nd Edition***, Oxford University Press, 2005 (ISBN: 9780195158335).
3. Optional textbook: Herniter, ***Schematic Capture with Cadence PSPICE, 2nd Edition***, Prentice Hall, 2004 (ISBN: 9780130484000).
4. Calculator - TCC Engineering students are required to own one of the following calculators: TI-85, TI-86, TI-89, TI-92, Voyage 200, HP-48, HP-49, HP-50, or TI-NSPIRE-CAS. These calculators have many advanced features that are especially useful in the electrical engineering courses. If you choose not to buy one of these calculators, you may be at a disadvantage to other students on a test.

Course Description:

EGR 261 covers topics including Laplace transforms and Laplace transform analysis of circuits, time and frequency domain representation of linear systems, methods of linear system analysis including convolution and Laplace transforms, frequency domain representation of signals including frequency response, filters, Fourier series, and Fourier transforms.

Course Objectives:

The general objectives of EGR 261 are to be able to:

- Determine Laplace and inverse Laplace transforms of a wide variety of functions
- Solve differential equations using Laplace transforms
- Perform frequency domain analysis of circuits using Laplace transforms
- Classify various types of signals and systems
- Determine the impulse response and convolution of signals
- Determine transfer functions and frequency response for various types of circuits
- Determine Fourier series representations, line spectra, and power distribution of periodic power signals
- Determine Fourier transforms, spectral density, and energy distribution of energy signals
- Analyze and characterize two port filters

Grading:

Course grades will be computed based on the following percentages:

4 Tests (15 % each)	60 %
Final Exam (comprehensive)	20 %
Homework Assignments	10 %
Computer Assignments	10 %

Grading Scale:

Grades will be based on the following scale:

- A (90 – 100)
- B (80 – 89)
- C (70 – 79)
- D (60 – 69)
- F (0 – 59)

Homework Assignments:

Regular reading and problem assignments will be made, usually on a weekly basis. The problems may be collected on the assigned due date for grading. Problem solutions will be given to the student when the homework is collected. No late homework assignments will be accepted. The lowest homework grade of those collected will be dropped.

Homework Format - Each assigned homework problem must be neatly presented and contain the complete problem statement as well as any associated circuits, diagrams, etc. A minimum 10% penalty may be given if these conditions are not met.

Computer Assignments:

Computer assignments will be made using PSPICE, a circuit analysis and simulation program produced by Cadence, as well as using MATLAB, MathCAD, or Excel. Examples and demonstrations will be provided with all computer assignments. Computer assignments may be accepted late with a 10% penalty.

Absence:

A missed test results in a grade of 0 unless the student notifies the instructor prior to class or within 24 hours of the class with an adequate reason. Notification may be made by phone or by message (mailboxes are in Building A). If a class is missed it is the responsibility of the student to obtain any information, assignments, etc., given during class.

Course Outline:

Note: Homework and Computer Assignments are assigned at various points throughout the course and are not listed in the outline.

Topics	Textbook Sections
I. Introduction to Laplace Transforms A. Applications in Electrical & Computer Engineering B. Definition and Basic Transform Pairs C. Transform Properties D. Inverse Transforms – Partial Fraction Expansion E. Solution of Differential Equations	Nilsson: Chapter 12, Sections 1-9 Lathi: Chapter 4, Sections 1-3 Lathi: Sections B.5
II. Laplace Transform Analysis of Circuits A. Laplace Transform Solution of Circuit Equations B. The Laplace Transformed Circuit C. Network Reduction Techniques D. Formulation of Circuit Equations	Nilsson: Chapter 13, Sections 1-5,7 Lathi: Chapter 4, Section 4
Test #1	
III. Introduction to Signals and Systems A. Overview and Motivation B. Classification of Systems C. Classification of Signals	Lathi: Chapter 1, Sections 1-4, 6-8
IV. Representation and Analysis of LLTI Systems A. Differential Equations B. Time Domain Techniques 1. Impulse Response Function 2. Convolution Test #2 C. Frequency Domain Techniques 1. Transfer Function 2. Frequency Response	Nilsson: Chapter 13, Section 6 Nilsson: Appendices D & E Lathi: Chapter 2, Sections 1-8
Test #3	
V. Frequency Domain Representation of Signals A. Periodic Power Signals 1. Fourier Series 2. Line Spectrum and Power Distribution B. Energy Signals 1. Fourier Transforms 2. Spectral Density and Energy Distribution	Nilsson: Chapter 16, Sections 1-9 Nilsson: Chapter 17, Sections 1-8 Lathi: Chapter 6, Sections 1-5 Lathi: Chapter 7, Sections 1-4, 6
Test #4	
VI. Applications A. Filters B. Signal Sampling C. Signal Multiplexing	Nilsson: Chapter 14, Sections 1-4 Nilsson: Chapter 15, Sections 1-2 Lathi: Chapter 7, Sections 5,7 Lathi: Chapter 8, Sections 1-2
Final Exam (comprehensive)	

General Information

TCC College and Student Handbook

Students are responsible for being aware of the policies, procedures, and student responsibilities contained within the current edition of the Tidewater Community College Catalog and Student Handbook. Students should familiarize themselves with the College's policies regarding misconduct and inclement weather policies found in the Student Handbook.

Last Day to Withdraw Without Academic Penalty

You may withdraw from a course without academic penalty during the first 60% of a session and receive a grade of "W"(withdrawal). The last day to withdraw without academic penalty is **October 29, 2009**. After that date, the student will receive a failing grade of "F" or "U". Exceptions to this policy may be made ONLY when initiated by the instructor and approved by the division dean; ONLY if you are able to document mitigating circumstances; and ONLY if you were making satisfactory progress in the course. **Students are advised to discuss attendance irregularities with the instructor. Do not simply stop attending. Failure to properly complete the withdrawal procedure may result in the assignment of "F" or "U" grades to your permanent record.**

Disability Services Statement

Disabilities Services of Tidewater Community College provides students, faculty, and staff programmatic and physical access in a supportive atmosphere and in accordance with Section 504 of the 1973 Rehabilitation Act and the Americans with Disabilities Act of 1990. In appreciation of the unique talents and needs of students with disabilities and chronic health issues, Disabilities Services further provides an array of services designed to enhance all educational experiences. *Students with disabilities or chronic health problems are encouraged to identify themselves to a Disability Services [DS] Counselor as early as possible. DS Counselors are on all campuses. Students with documented disabilities may qualify for academic accommodations such as more time on tests, sign language interpreting or Braille.*

Emergency Procedures

In the event of a bomb threat, tornado, or fire, students and staff may be asked to evacuate the building or move to a secure location within the building. Evacuation routes for movement to an external location or to a shelter within the building are posted at the front of the room. Students should review the maps and make sure that the exit route and assembly location for the building are clearly understood. If you have a disability that may require assistance during an evacuation, please let your faculty know at the end of the first class.

Cheating

College rules state that a student may be subjected to disciplinary action for academic cheating, plagiarism, or assisting in cheating or plagiarism. Disciplinary penalties include college dismissal or suspension. In addition, cheating, plagiarism, or assisting such activity is a most serious form of academic misconduct, and will in the sole discretion of the faculty member result in a grade of F on the work or for the course. A single act of cheating may subject a student to both a failing grade in the course, and student disciplinary action perhaps involving suspension or dismissal from TCC.