

ETE 450

COURSE OUTLINE

| | |
|--|---|
| Course Information | ABET Unit Classification (4 Quarter Units) |
| Department: Engineering Technology Course Number: ETE 450 Course Title: DSP & Digital Control Systems Revision Date: 11-30-2004 Revised by: Tariq Qayyum Compliant: Catalog 2004/05 | Math: Basic Science: Engineering Topics: 4 <i>Contains significant design content:</i> Yes Other: Curriculum Designation: Required |

I. Catalog Description

ETE 450/L DSP & Digital Control Systems/Lab (3/1)

Introduction to digital signal processing, sampling techniques; zero-order hold circuits, z-transforms and difference equations; digital filters, frequency and phase response; applications of digital controls. Three lectures/problems-solving and one three-hour laboratory.

II. Prerequisites and Corequisites

ETE 350, ETE 344. ETE 450 and ETE 450L are corequisites.

III. Textbook and/or other Required Material

Fundamentals of Digital Signal Processing
 Joyce Van de Vegte, Prentice Hall

IV. Course Objectives

After completing this course the student will be able to:

1. Understand the principles of digital signal processing
2. Solve difference equations to find impulse and step response
3. Analyze and design simple FIR and IIR filters
4. Perform frequency domain analysis of digital filters
5. Analyze digital PID control systems

V. Expanded Course Description

A. Course Description

1. Introduction
2. Analog to Digital Conversions
3. Difference equations
4. Filtering, z-Transforms
5. Transferring to frequency domain
6. FIR and IR Filters
7. Hardware for DSPs
8. Digital controls

B. Laboratory Experiments

1. Debugger and number systems used in TMS320C3x
2. Generating tones of different frequencies
3. Aliasing and Quantization errors
4. Filters
5. Fourier transforms
6. DSP applications in digital controls (Project)

VI. Class/Laboratory Schedule

Lecture: Two 75 minutes sessions per week
 Lab: One three-hour session per week

VII. Contribution of Course to Professional Component

Students learn to set-up test apparatus, to conduct engineering experiments and to prepare technical reports. Students also learn to analyze filters, plot frequency response and phase response of filters and learn about real life applications of digital signal processing and digital control systems.

VIII. Evaluation of Students

The instructor evaluates outcomes using the following methods:

- Homework assignment submittals
- Examinations and quizzes
- Laboratory Experiments
- Laboratory reports

The student grades are typically based on the following factors:
 quizzes, homework, midterm exam and final Exam

IX. Relationship of Course to Program Outcomes

| Crse Obj | Program Outcomes | | | | | | | | | | |
|-------------|---|--|-------------------------------|--|----------------------------|----------------------------|-------------------|-------------------------------|--|--|---|
| | (a) Use of modern tools of discipl | (b) Use of math, science, Engg & Tech | (c) Do experi- ments | (d) Dsn of sys & compo nents | (e) Work on teams | (f) Do Tech probs | (g) Eff Com | (h) Life- long learn | (i) Prof, ethics, social resps | (j) Prof, soc, globl, diversity | (k) Qual, Cont impr, timeli ness |
| 1 | | X | | | | X | | | | | |
| 2 | | X | X | | | X | | | | | |
| 3 | X | X | X | | | X | | | | | |
| 4 | | X | X | | | X | | | | | |
| 5 | X | X | X | | X | X | X | | | | |