Klipsch School of Electrical and Computer Engineering
College of Engineering
New Mexico State University

EE 395: Introduction to Digital Signal Processing, 3.0 Credits
Fall 2013

Class Schedule: MWF 9:30-10:20 AM
Class Location: Thomas & Brown, Rm 307

Instructor:
Dr. Charles (Chuck) Creusere
Room 160D Goddard Hall
Phone: 646-3919
email: ccreuser@nmsu.edu

Office hours: M 3-4PM, T 10-11AM; by appointment (recommended).

Course Description:
Undergraduate treatment of sampling/reconstruction, quantization, discrete-time systems, digital filtering, z-transforms, transfer functions, digital filter realizations, discrete Fourier transform (DFT) and fast Fourier transform (FFT), finite impulse response (FIR) and infinite impulse response (IIR) filter design, and digital signal processing (DSP) applications.

Prerequisites: EE314 or equivalent (Signals and Systems II)

Textbooks:

Required: I*ntroduction to Signal Processing* by Sophocles Orfanidis (available at FedEx Office on University Ave. for $54, PDF edition free)
http://www.ece.rutgers.edu/~orfanidi/intro2sp/

Required: DSP Software Toolkit by Phillip L. De Leon (available at FedEx Office on University Ave. for $20, download free)
http://www.ece.nmsu.edu/~pdeleon/Teaching/EE395/DSP_Toolkit.pdf

Other Useful References (not required):

A. Gilat, *MATLAB: An Introduction with Applications*, ISBN 0-471-69420-7.

Software:

MATLAB , Signal Processing Toolbox (available on T&B lab computers). Purchase of MATLAB is optional.

A computer with a C compiler.

Online Resources: Canvas

Course Objectives:
After completing this course, the student should be comfortable with the theory and practice of digital signal processing including:

1. sampling and reconstruction and quantization effects
2. discrete-time systems, digital filtering, and digital filter realizations
3. z-transform analysis
4. discrete Fourier transform (DFT) and fast Fourier transform (FFT)
5. finite impulse response (FIR) and infinite impulse response (IIR) filter design

Contributions of EE395 to Meeting the Professional Component

Introduction to DSP is the undergraduate foundation course in DSP within the Electrical Engineering curriculum and is considered an engineering topics course in the Professional Component. Students in EE395 will apply techniques learned in class through assigned homework, software development, and in-class discussions. Techniques learned in this class will provide students with a broadening of their knowledge base to see applications of basic mathematics and engineering science techniques to the processing and analyzing of signals in the digital domain, provide preparation for capstone design projects, and provide a basis for future employment or educational advancement. The class provides 3 credits of engineering science credit.

Relationship of the Course to Program Objectives

Introduction to DSP builds upon mathematics and engineering techniques learned in previous courses to provide an electrical engineering breadth elective to give students:
• an understanding of actual products (DSP-based electronics),
• a basis for capstone design classes,
• a preparation for career employment or graduate school,
• an opportunity to use computers in engineering problem solving.

This will allow students to further explore their major specialty as well as seeing applications of basic techniques learned from calculus, linear algebra, linear systems theory, and other engineering classes.

Grading:

Homework: There will be weekly homework assignments consisting of textbook problems and/or computer projects (both C and Matlab). Worth 15% of the final grade. Late assignments will not be accepted.

Quizzes: There will be weekly on-line quizzes most weeks using the Canvas system. In total, they will be worth 10% of the final class grade.

Miniprojects: These are practical DSP assignments that will given out periodically. They will be worth 20% of the class grade in total.

Essay: Worth 5% of final class grade.

Exams: There will be two midterm exams worth a total of 30% of the final grade. There will be no makeup exams except in the case of serious documented illness. The exams will be held on the following dates: Wednesday, Oct. 9, 2013 during class and Wednesday, Nov. 6, 2013 during class . If you have any professional conflicts with these dates, you must contact me at least 2 weeks in advance to arrange to take the exam early. Makeup exams will only be given with proof of medical illness.

Final: The final, comprehensive examination is scheduled for Monday, December 9, 2013 from 8:00-10:00AM. It is worth 20% of the final grade. *Student will have the option of replacing the numeric score of one midterm with that of their final.*

Re-grading: If a student feels that the grading on any assignment or exam is in error, they must bring the problem to the instructors attention **within 1 week** of receiving the graded assignment and solutions.

Calculating Final Grades: You are **guaranteed** to receive whatever 'flat' (i.e., no plus or minus) final grade that you earn based on the following absolute scale: 90%+ = A, 80-89% = B, 70-79% = C, 60-69% = D, <59% = F. Cluster grading will be applied, however but only if it is advantageous to the student, and it may result in a plus or minus that improves a students grade. Letter grades will not be assigned for individual exams.

Policies:

You may discuss homework and programming assignments with either myself, the TA, or your peers. This discussion could include among other things, various approaches to a homework problem, algorithms for a software project, programming tips, and various theoretical insights. Be aware, however, that all submitted solutions to homeworks and projects must be written or coded (in the case of software) by the individual. There is to be no "sharing" of solutions. **Any plagiarism or cheating will result in an automatic F in the course.**

*Exam Calculator Policy***:** Only the following Klipsch School-approved calculators will be allowed during exams: Casio fx-115 models (calculator must contain fx-115 in its model name), HP 33s and HP 35s, and TI-30X and TI-36X models (calculator must contain TI-30X or TI-36X in its model name).

EEO/ADA Information:

Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act (ADA) covers issues relating to disability and accommodations. If a student has questions or needs an accommodation in the classroom (all medical information is treated confidentially), contact:
Trudy Luken
Student Accessibility Services (SAS) - Corbett Center, Rm. 244
Phone: (575) 646-6840 E-mail: sas@nmsu.edu
Website: http://www.nmsu.edu/~ssd/

NMSU policy prohibits discrimination on the basis of age, ancestry, color, disability, gender identity, genetic information, national origin, race, religion, retaliation, serious medical condition, sex, sexual orientation, spousal affiliation and protected veterans status. Furthermore, Title IX prohibits sex discrimination to include sexual misconduct, sexual violence, sexual harassment and retaliation.

For more information on discrimination issues, Title IX or NMSU's complaint process contact:

Gerard Nevarez or Agustin Diaz
Office of Institutional Equity (OIE) - O'Loughlin House
Phone: (575) 646-3635 E-mail: equity@nmsu.edu
Website: http://www.nmsu.edu/~eeo/

Prepared by: C. Creusere, 08/15/07