Miami Dade College

Course Competencies Template - Form 112

GENERAL INFORMATION	
Name: Diane King	Phone #: 77021
Course Prefix/Number: CET 4190C	Course Title: Applied Digital Signal Processing
Number of Credits: 4	
Degree Type	☐ B.A. ☐ B.S. ☒ B.A.S ☐ A.A. ☐ A.S. ☐ A.A.S. ☐ C.C.C. ☐ A.T.C. ☐ V.C.C
Date Submitted/Revised:	Effective Year/Term: 2009-2
☒ New Course Competency ☐ Revised Course Competency	
Course to be designated as a General Education course (part of the 36 hours of A.A. Gen. Ed. coursework): ☐ Yes ☒ No	
The above course links to the following Learning Outcomes: ☐ Communication ☒ Numbers / Data ☒ Critical thinking ☐ Information Literacy ☐ Cultural / Global Perspective ☐ Social Responsibility ☐ Ethical Issues ☒ Computer / Technology Usage ☐ Aesthetic / Creative Activities ☐ Environmental Responsibility	
Course Description (limit to 50 words or less, **must correspond with course description on Form 102**): This is an upper division level course for students majoring in electronics engineering technology. Digital signal processing (DSP) is the study of signals in a digital representation and the processing methods of these signals. Students learn digital signal processing and analog signal processing, including how to convert between analog and digital forms, how to measure or filter signals, technologies used for digital signal processing including field-programmable gate arrays (FPGAs), digital signal controllers (mostly for industrial apps such as motor control), and stream processors, among others. Prerequisites: CET 3126C, EET4136C. Laboratory fee. (2 hr. lecture, 4 hr. lab)	
Prerequisite(s): CET 3126C, EET4136C	Co requisite(s):

Course Competencies:

Competency 1: The student will demonstrate an understanding of the DSP development platform by:

1. Describing the Embedded Processor and the Micro-signal architecture.
2. Discussing the concept of real-time embedded signal processing.
3. Configuring the VisualDSP++ integrated development environment (IDE).
4. Verifying the functionality of the VisualDSP++ IDE.

Competency 2: The student will demonstrate an understanding of time-domain signals and systems by:

1. Describing the concept of a time-domain digital signal.

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2. Discriminating between periodic and random signals.
3. Developing basic digital filters.
4. Implementing and testing basic filters in a real-time embedded DSP system.

Competency 3: The student will demonstrate an understanding of frequency-domain analysis and processing by:

1. Describing the z-transform and its application to digital filtering.
2. Applying frequency analysis through the frequency response of a digital system.
3. Implementing the Discrete Fourier Transform (DFT).
4. Implementing the Fast Fourier Transform (FFT).
5. Describing and implementing the concepts of windowing functions.

Competency 4: The student will demonstrate an understanding of digital filters by:

1. Discussing the ideal filter and practical filter specifications.
2. Analyzing the characteristics, implementation, and design of
   - finite-impulse response (FIR) filters
   - infinite-impulse response (IIR) filters.
3. Describing the structure, algorithms, and design concepts of adaptive filters.
4. Designing and formulating an adaptive line enhancer in a real-time embedded DSP system.

Competency 5: The student will demonstrate an understanding of embedded signal processing systems and concepts by:

1. Describing the Blackfin embedded processor, its architecture, and its applications.
2. Analyzing real-time DSP fundamentals and implementation considerations such as number formats, dynamic range, precision, and quantization errors.
3. Using the memory system and data transfer using the Blackfin processor.
4. Applying code optimization techniques and power management in the Blackfin processor.
5. Implementing practical DSP applications such as audio coding and audio effects and image processing algorithms.