ECE 482/582 – Computer Vision & Digital Image Processing

ABET Syllabus

Catalog Data:  ECE 482: Computer Vision and Digital Image Processing. Three hours. Introduction to computer vision and digital image processing with emphasis on image representation, transforms, filtering, compression, boundary detection and pattern matching.

Prerequisite:  MATH 355 and CS124 or consent of instructor. Prerequisite topics: Knowledge of computer programming fundamentals, basic statistics, and microcomputer usage and applications.


Relationship of Course toward Meeting ABET Program Outcomes:

The course supports instruction for Program Outcomes C and K as required by ABET Criterion 3 of EC 2000 and ABET Program Criteria. The relationships are indicated in the Course Learning Objectives.

The course does not include direct assessment for Program Outcomes.

Course Learning Objectives:

The overall course objective is to teach students basic techniques used in processing digital images and video for filtering, compression, feature recognition, classification and understanding as applied to engineering. At the end of this course, students are expected to be able to:

1. Develop software for implementing image-processing algorithms using industry-standard software development systems such as MATLAB, C development systems, and Visual C++. (Outcome C, K)
2. Develop software for interactive image manipulation using MATLAB or an approved alternative environment. (Outcome C)
3. Demonstrate knowledge of image processing fundamentals and algorithms. (Outcome K)
4. Utilize the World Wide Web to access assignments, class notes, background material, and programming examples from the class website. (Outcome K)

Program Outcome Measure Assessments:

The course does not include direct assessment for Program Outcomes.

Contribution of Course to Meeting the ABET professional component:

- Skills required, used, and developed include MATLAB, C and/or C++ programming of applications for image and video processing applications.
- Estimated Content: Engineering Science: 2.0 credit, Engineering Design 1.0 credits

Relationship of Course to Program Objectives:

The course supports Program Objective 1 by developing knowledge of basic image processing algorithms and systems; increasing the student’s ability to design a system, component or a process to meet specified image processing needs.

Topics Covered During Class:

1. Course organization and requirements (1 hr)
2. Elements of a Digital Image Processing System (2.50 hrs)
4. Image Transforms and Applications (7.50 hrs)
5. Image Filtering and Applications (5.00 hrs)
6. Image Reconstruction and Restoration (5.00 hrs)
7. Additional Image Processing Algorithms (7.50 hrs)
8. Image Segmentation and Feature Extraction (6.00 hrs)
10. Mid-term exams (1.50 hrs)
11. Final comprehensive exam (2.50 hrs)

45 hours plus 2.5-hour final exam

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Date: 11 August 2008