**Elective Course:** ECE 53700 Multimedia Applications

**Credit and contact hours:** (3 cr.) Class 3

**2014-16 IUPUI Campus Bulletin description:** ECE 53700 Multimedia Applications (3 cr.) P: ECE 30100 and ECE 36200, or Graduate Standing. Class 3. Treatment of multimedia algorithms and their hardware and software implementations using FPGA and ASIC. Detailed discussion of entropy coding, transform coding, speech compression, image compression, and video compression.

**Prerequisite or corequisite:** P: ECE 301 and ECE 362

**Prerequisites by topic:** Familiarity with system theory. Basic knowledge of digital systems equivalent to an introductory course in digital logic and microprocessor architecture.

**Textbook:** M. El-Sharkawy, *Signal Processing, Image Processing and Graphic Application with Motorola’s DSP96002 Processor*, Prentice-Hall, 1994. Chapter books will be on reserve in the library

**Coordinator:** Mohamed. El-Sharkawy, Professor of Electrical and Computer Engineering

**Goals:** This course presents the basic multimedia algorithms and the implementation of these algorithms using high speed multimedia processors. The course goals are to assist students in: 1) learning the mathematics and system concept upon which speech, image and video processing are based; 2) learning multimedia algorithms and techniques and 3) implementing those algorithms using high speed multimedia processor.

**Outcomes:** Upon successful completion of the course, students should be able to

1. Implement different compression standards. [a, c]
2. Describe the different multimedia standards. [a]
3. Design basic multimedia compression algorithms that demonstrate an understanding of C high-level synthesis. [a, c, e]
4. Implement basic multimedia compression algorithms using C high-level synthesis. [k]

**Topics:**

1. Introduction to Multimedia and Multimedia Processors
2. Entropy Coding
3. Transform Coding
4. Speech Compression
5. Speech Compression Standards
6. Image Compression
7. Image Compression Standards
8. Video Compression
9. Video Compression Standards
10. Exams (2.0 classes and final exam period)

**Computer usage:**

1. Motorola’s DSP 96xxx Floating-Point Multimedia Processor.
2. Assembly Language.

**Laboratory projects:**

1. Introduction to the floating-point processor and the application development system.
2. Introduction to the assembler and simulation packages.
3. Architecture and addressing modes of floating-point processors.
4. Instruction set.
| | Multimedia applications with floating-point processors.  
| | Introduction to image processing applications.  
| | Advanced image processing applications.  
| | JPEG standards with floating-point.  
| **Evaluation methods:** | Two midterm exams, laboratory projects, and final comprehensive exam.  
| **ABET category:** | Engineering science 70%, engineering design 30%.  
| **Prepared by:** | Mohamed El-Sharkawy  
| **Date:** | January 13, 2014 |