

Department of Electrical and Computer Engineering
520.425 FPGA Project Laboratory
Spring 2008

2005 - 07 Catalog: Laboratory course for senior projects that are FPGA-based. Students will work in teams to complete a design project that applies an embedded FPGA. The projects will make use of the 200K gate Spartan2 development boards and other resources from the FPGA Synthesis lab. Possible projects include:

1. A 32 bit RISC processor with student designed ISA architecture, and assembler; or an FPGA emulation of an existing microprocessor such as an 8051;
2. An optical communication system to transmit stereo music or other information using various modulation schemes for comparison. This would include FM and at least one digital scheme such as FSK;
3. A stand-alone video game. FPGA handles keyboard inputs, video, and all game dynamics.
4. A real time encrypter/decrypter implementing the DES-128 bit standard. Hardware must handle a high speed data stream of order 100 Kbytes per second. Students are expected to complete a demonstration, give a verbal presentation design review, and produce a final poster session to IEEE standards. (3 credit hours/Elective)

Prerequisite(s): 520.424 and senior status, no exceptions

Textbook: None. Students research their own appropriate reference material.

Course Objectives: 1. Gain experience in applying engineering methods to a system design.
2. Improve ability to establish, and design to, detailed requirements.
2. Gain experience in working in a team environment.
3. Improve presentation and reporting skills.

Topics Covered: Supplementary material may be presented, tuned to particular projects.

Class Schedule: Flexible, with students scheduling their own time, and periodic meetings for progress reports and coaching.

Contribution of Course to Meeting the Professional Component (credit hours):

Engineering Science	Engineering Science and Design
	3

Relationship of Course to Program Educational Outcomes (✓ those that apply):

x	Apply mathematics, probability and statistics, basic science, and computer science
x	Design and conduct experiments, analyze and interpret data
x	Identify, formulate and solve electrical engineering problems
x	Use technical skills and modern engineering tools to design to meet needs
x	Communicate effectively and work on multidisciplinary teams
x	Contemporary issues, ethical responsibilities, environmental, health, safety issues
	Engage in life-long learning

Prepared November 1, 2007 by: Robert Jenkins