CSCE 2114 Digital Design

Catalog Description:

This course introduces the many levels of abstraction that enable today's digital computing systems. It explores design at the layers of a computing platform from switches and wire to a programmable machine. It introduces the hardware aspects of digital computers, logic gates, flip-flops, reduction, finite state machines, combinational and sequential logic design, digital systems, software design tools, hardware description language (VHDL), and implementation technologies.

Corequisite: Lab component.

Prerequisites: MATH 2554 or MATH2445: Calculus I (with a grade of “C” or better)

Required Textbook:


Recommended Reference:


Goals: The goal of the class is to develop the ability to apply knowledge of digital logic to the design of a microprocessor and operate an advanced CAD software application.

Topics covered:

- Design Concepts
- Intro. to Logic Circuits
- Implementation Technology
- Optimized Implementation of Logic Functions
- Number Representation
- Arithmetic Circuits
- Combinational Circuits
- Flip-Flops, Registers, and Counters
- Synchronous Sequential Circuits
- Asynchronous Sequential Circuits
- Digital Systems
- Computer Aided Design Tools
- Breadboard Techniques
- Basic Logic Techniques
- Sequential Circuits
• CAD Tools
• FPGA Implementations

Class/laboratory schedule:

Meets either 3 times a week for 50 minutes or 2 times a week for 1 hour 20 minutes for 15 weeks. Lab meets once a week for 2 class periods. Laboratories meet 8 times for 2 hours per lab.

Evaluation Methods and Grading:

Grades in this class will be determined by a weighted average of the following:

- Attendance and Participation: 10%
- Homework: 20%
- Labs: 15%
- Two midterm exams: 25%
- Final Exam (cumulative): 30%

Only exam grades may be curved. We will use the following scale to assign final grades:

A: [90, 100]  B: [80, 90),  C: [70, 80),  D: [60, 70),  F: below 60%

Special note: I do not inflate grades. Grade inflation is a kind of lying about your ability. But, for a variety of reasons, some faculty members find it useful to inflate grades, and so do some of their students. Thus, in the remote case that you expect me to inflate your grade, drop this course now or change your expectations. Based on this philosophy, I do not touch your grade unless there is a mistake, and your TA has full authority on your assignment and lab grading. Zero is always a zero even after curving.

Students must get a 60% or better on labs and homework. Hence, an overall average greater than 60% may still result in a failure in some cases. For homework and labs, the late penalty is 10% per day. No credit will be given if solutions are released.

Absences:

You must notify the instructor via email if you are not able to attend a test or will be late with an assignment. You are to notify the instructor before the test or assignment due date if at all possible. Excused absences are allowed with a written record for illness, death of a family member, and other reasonable emergencies.

Academic Honesty:

As a core part of its mission, the University of Arkansas provides students with the opportunity to further their educational goals through programs of study and research in an environment that promotes freedom of inquiry and academic responsibility. Accomplishing this mission is only possible when intellectual honesty and individual integrity prevail.

Each University of Arkansas student is required to be familiar with and abide by the University’s ‘Academic Integrity Policy’ which may be found at honesty.uark.edu/policy. Students with
questions about how these policies apply to a particular course or assignment should immediately contact their instructor.

Emergency Preparedness:

Many types of emergencies can occur on campus; instructions for specific emergencies such as severe weather, active shooter, or fire can be found at emergency.uark.edu. The University of Arkansas has a campus-wide alert system for any hazardous conditions that may arise on campus. To learn more and to sign up: http://safety.uark.edu/emergency-preparedness/emergency-notification-system/

Inclement Weather:

If the university is officially closed, class will not be held. When the university is open, you are expected to make a reasonable effort to attend class, but not if you do not feel that you can get to campus safely. Any changes to due dates or the class schedule will be communicated via email to your uark email address.

Academic Support:

University of Arkansas Academic Policy Series 1520.10 requires that students with disabilities are provided reasonable accommodations to ensure their equal access to course content. If you have a documented disability and require accommodations, please contact me privately at the beginning of the semester to make arrangements for necessary classroom adjustments. Please note, you must first verify your eligibility for these through the Center for Educational Access (contact 479–575–3104 or visit http://cea.uark.edu for more information on registration procedures).

Relationship of course to Computer Engineering Program Student Outcomes:

- (a) An ability to apply knowledge of mathematics, science, and engineering.
- (b) An ability to design and conduct experiments, as well as to analyze and interpret data.
- (c) An ability to identify, formulate, and solve engineering problems.
- (k) An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Relationship of course to Computer Science Program Student Outcomes:

- (a) An ability to apply knowledge of computing and mathematics appropriate to the discipline.
- (b) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution.
- (c) An ability to design, implement and evaluate a computer-based system, process, component or program to meet desired needs.
- (i) An ability to use current techniques, skills, and tools necessary for computing practices.