

## **EE242 Digital Systems Design Projects**

**Group Projects:** Each group will choose a design project from the list shown below. Each group will prepare a formal design project written report and will prepare and give an oral presentation of their project. The oral presentation should focus on teaching us based on your written report (i.e. go through the procedure, objectives, problems, conclusions) and should culminate with a demonstration of your project. The presentation should be 5-7 minutes in length.

1. Design a stopwatch with the following criteria: use the 7-segment display to show data ranging from tens of seconds to hundredths of seconds (i.e. 12.34), use pushbutton control to provide the start, stop, and reset functions.
2. Design a dice game with the ability for a user to play against the computer (Altera). Use the 7-segment display to show the results of the roll of the dice and develop a score keeping system.
3. Design a simple version of the card game blackjack. Allow a user to play against the computer (Altera) with the 7-segment display showing the cards. Develop and implement a score keeping system.
4. Design a four-way traffic light control system. The system should illuminate green, yellow, and red LEDs in the proper sequence to control an intersection with North/South and East/West traffic patterns. The North/South route should have the right-of-way for 60 seconds while the East/West route should have the right-of-way for 30 seconds.
5. Design a 4-bit ALU that performs the following 8 functions: addition, subtraction, AND, NAND, OR, NOR, XOR, and XNOR.
6. Design a combination lock that allows the user to configure a 4 decimal value sequence password and then provides access control based upon that sequence. The lock should not allow more than three attempts for a user to input the correct combination.
7. Design a project of your own interest – to do this, you must outline your proposed project and receive approval from your instructor.