**ECEN 340**

**Final Lab Project**

Purposes:

1. To define a complex digital system

2. To collaborate with others on your design

3. To implement a complex digital system

4. To give a technical report

Overview:

For this lab, you will be asked to research and design a complex digital system, such as a CPU or a four-function Calculator with real-time memory. You will work in small groups to define and complete this design. The group sizes should be 1 to 3 individuals (the more people, the more complex the project should be).

Peer Reviews:

Each project will have two reviews—one review will take place after the project definition, and the second review will take place after the project completion (or near completion). Class time will be available for these reviews.

The reviewing body will consist of all members of your design team and at least two others who are not part of your design team.

Each student will review the projects of at least two other projects and give feedback.

Scope of Project:

Each project must contain at least 3 elements from the technology inclusion list.

Technology Inclusion List:

Finite State Machine (at least 3 states)

Real – Time Memory access at 100MHz

Higher level Math Functions (Multiply or Divide)

Keyboard or Mouse I/O

7-segment display

External Sensors (light, sound, off-board switches)

VGA Port

Parallel Interface to Other Board

Serial Interface to Other Board

Analog to Digital Converters (ADCs) or Digital to Analog Converters (DACs)

Other approved technology

Functionality Demonstration:

Each project must be demonstrated to the instructor. A video recording is sufficient to demonstrate the project. The video should be submitted along with a written report.

Written Report:

A report will be written describing the project and the results. This report should contain:

* First and second peer review notes. Include the names of those present and also document the comments that were made.
* A description of the project. Include diagrams of the project if it includes external components.
* Verilog code.
* Figures and graphs necessary to describe the project.
* A conclusion statement. As part of the conclusion statement, the level of functionality should be discussed.