Introduction to the Lab
Lab Instructor

• Background
  – University Affiliation (Undergrad, grad, faculty, etc)
  – Area of Study and Interests

• Contact Info
  – Email
  – Office

• Office Hours
  – Open Lab Hours
Enrolled and Open Labs

Enrolled Labs
- Your **home** lab
- Labs graded by home lab instructor
- You receive priority help

Open Labs
- Anyone can attend any open lab with same help priority
- Open labs posted on lab website (next slide)
- Your home section provides average support: 
  ~170mins/16students = **10.625mins** per student
- **TAKE ADVANTAGE OF OPEN LABS!!!!!!**
Open Lab Hours

Supported open lab hours (tentative)
• Monday 4-5
• Tuesday 1-4
• Wednesday 4-5
• Thursday 1-4
• Friday ? (note, this Fr there will be hours from 1-4)

Unsupported open lab hours (tentative)
• Monday – Thursday 12 -1p
• Friday 12 - ?
Attending Other Labs

EECS 270 Labs

- Home section students have priority for stations and help.
- NOTE: In the spring term you can usually get a station and help in the alternate home lab section.
- Don’t forget the staffed open labs if you need additional help.
Assignment Components

• Pre-Lab
  – Preliminary lab work that can be completed outside the lab:
    • Simulations
    • Answers to pre-lab questions
    • Attend open lab if you need additional help before the lab!

• In-Lab
  – Functional demonstration on lab kit

• Post-Lab
  – Answers to post lab questions
  – May contain simulations or brief write-up
Submission Policy

• Pre/Post lab assignments must be submitted electronically to your Ctools home lab section.

• All materials **MUST** be submitted in a composite (1) PDF file:
  – Verilog Code
  – Schematic Images
  – QSF Constraint Listing
  – Answers to Questions
  – Simulation Waveforms
  – Handwritten scanned materials

• See Suggestions Link
  – A link is listed with the first lab with suggestions for creating composite PDF file.
  – Various tools are available to integrate
    • PDF Integrators
    • Word Processors
Example Composite Submission

Submission Order is Specified in Lab Assignment
I.E. Lab 1
1. SELECTOR schematic
2. QSF listing
3. Simulation Waveform
4. Test bench
5. Answers to Questions
Submission Policy Continued

• In-lab demonstrations must be certified by a 270 lab instructor.
  – Print the In-lab certification sheet and fill in the student part.
  – Demonstrate to any 270 lab instructor.
  – The instructor will verify your demo and collect the certification sheet.
Submission Policy cont

• Lab components are due according to the schedule posted on the lab webpage. (next slide)
• Pre and Post labs may be submitted up to this time electronically without penalty.
• In-labs may be certified in lab anytime before this time without penalty.
• Lab materials submitted after this time will be subject to 10%/day late penalty (Saturday and Sunday not counted as late day).
• To be considered for a late penalty waiver, contact your lab instructor as soon as possible. Waivers will be considered for documented illness and other extenuating circumstances.
# Assignment Schedule

Sample (Complete Schedule Posted on Lab Webpage)

<table>
<thead>
<tr>
<th>Week</th>
<th>Assignment</th>
<th>Support Documents</th>
<th>Mon/Wed Lab Sections</th>
<th>Tu/Th Lab Sections</th>
<th>Pre-Lab Due</th>
<th>In-Lab Due</th>
<th>Post-Lab Due</th>
<th>Schedule Exceptions</th>
</tr>
</thead>
</table>
| 1    | Labs Start Wed, May 4  
Quartus Tutorial |  
Lab Overview  
Intro Slides.pdf  
Intro Slides ppt  
Simulation Reference | Wed May-7 | Th May-8 | Nothing Due | Nothing Due | Nothing Due | No lab Tu May 6. Labs begin Wed May 7 |
| 2    | Introduction to Quartus:  
Lab 1 |  
Lab Submission Policy  
HEX # Systems | 1p, Mon 12-May | 9a Tu 13-May | 1 | - | - | - |
| 2    | Timing and Delay:  
Lab 2 |  | 1p, Wed 14-May | 9a Th 13-May | 2 | 1 | 1 | - |

Lab Assignment

Support Materials

Pre-Lab 2, In-Lab 1 and Post Lab 1 Due by Beginning of Lab Period
Grading Cycle and Reporting

• Labs will be graded in 1 week or less after the due date.
• Graded labs will be on your home lab section Ctools site including In-lab scores.
• Review your graded materials and grades.
• Notify the instructor soon after the posting for change consideration.
Book Bags

• The lab isles are narrow, so be sure to keep your book bags out of the isle.
• You can place them under the desk.
Food and Drink

• No Food or Drink is allowed in the lab.
• You may have water, but please no glass containers.
• Instructors are allowed food because of extended hours.
Emergency Exit

- In the event of an emergency alarm, you must exit the building.
- **DO NOT** exit into the parking area between EECS and the Auto Lab as seen out of the lab window.
- Use center stairs and **EXIT via the atrium** and out either end preferably toward the bell tower.
- In the event that someone needs medical attention, there is a campus phone on the instructors desk. Dial 911 for Campus Safety.
General Lab Support Policy

• You are expected to develop debugging and development skills over the course of the labs.
• The lab instructor is available to tutor and provide support in these methods.
• The lab instructor will attempt to assess your problem and recommend a path of action to help YOU debug the problem.
• You should pursue this path and consider how it addresses your problem before consulting the instructor again.
• Do not expect to resolve hardware debugging issues with a few words from the instructor or a simple recommendation.
• Hardware debugging takes time, but can be productive if approached in a systematic and constructive manner.
The Help Queue

• A help queue is maintained on the front white board to provide even, orderly help.

• Place your first name and station number in the first available slot when you need help.
  – You may only enter your name once.
  – You should only enter your name if you have a prepared question.
  – Put signoff next to your name if you have a In-lab demo and you will be give priority.
  – If you are visiting a home lab, you must write visitor next to your name.

• The lab instructors will attempt to move thru the queue as efficiently as possible so use their time wisely.
270 Homework Support

- 270 Lab Instructors are only prepared to provide lab support.
- You should always use the course GSI office hours first for homework support.
- You should always email the course GSI for homework issues and questions.
- You may ask a 270 Lab Instructor for homework support, but keep in mind you should always check with the course GSI for correctness.
- 270 Lab Instructors will always give priority to lab support.
Email Support

• While it is possible to address minor issues with email, it is generally very difficult to address lab issues with email.

• In the lab, the instructor can interact with you much easier and assess the problem quicker.

• Instructors are not allocated time for extensive email support.

• The best way to get lab support is to go to open lab or your home lab!
Collaboration

• All lab work in 270 is done individually

• You may seek help or discuss such problems with others such as:
  – CAD tool use, for example:
    • How do I find this function?
    • How do I make this connection?
  – What does this error mean?
  – DE2 kit details, for example:
    • How do I program the FPGA?
    • Where is this switch?

• You may not discuss or provide help on specific solutions to lab design problems or questions with others.
Lab Environment

CAD: Computer Aided Design Tools
- Design Entry
- Simulation
- FPGA Programming

Input Devices:
- Switches,
- Audio,
- Serial,
- USB, etc

FPGA: Programmable Logic Device

Output Devices:
- LEDS, 7 Segment LEDS,
- LCD, Video,
- Serial, etc
Altera DE2 Kit
Alternate Lab Resources

• DE2 Kits
  – Academic offer available from Altera
  – See Altera Web Site for details

• Quartus Software
  – Free Web Pack from Altera (download)
  – Runs under Windows OS, but compatible with Linux Versions.
  – Good for doing design entry and simulations
  – Must import your project files to run in lab or use removable media ie USB drive

• CAEN Labs
  – Quartus is available under Linux Boot (and Windows)
  – Can use AFS file space which is accessible in 270 lab

• CAEN Remote Connection with VNC
  – Just like being in the 270 lab or CAEN lab (without the kit)
  – Great for doing design entry, simulations, etc
Today's Assignment

- Do Tutorial
- You will Learn:
  - Basic Design Entry
    - Express your logic design in abstract form (schematic)
  - Simulation
    - Check the functionality of your design
  - Synthesis
    - Converts your design into a form that can program the FPGA
  - FPGA Programming
    - Program the FPGA on the DE2 and check your logic function
  - Basics of DE2 Kit
    - Switches and LEDs
- Finished? Get Started on Pre-Lab 1 assignment. It is due at the beginning of the next lab period!