


**University of Texas at El Paso**  
**ECE 2103: Lab for Digital Systems Design I**  
**Syllabus – Lab Policies and Guidelines**  
**Lab Section for students in: ECE major**

- ❖ **Lab Description:** Implementation and testing of combinational and sequential digital systems. Lab assignments consist of software simulation and hardware implementation.
- **Prerequisite:** EE 1305/ECE1300 and EE 1105/ECE1100, each with a grade of “C” or better; or CS 1301 and CS 1101, each with a grade of “C” or better; or CS 1401 with a grade of “C” or better.
  - **Co-requisite:** EE 2369/ ECE2303 (Digital Systems Design I). Please note that the lab is 1 credit hour, and the grade for the lab is calculated separately from the grade in the EE2369/ECE2303.
  - **Lab Sessions:** Each week, students are responsible for going over the provided resources; attending the lab session in which they registered; completing the lab activities; and demonstrating their work during their in-person lab session.
  - **Course Outcomes:** At the end of this course students will be able to:
    - Utilize the standard design sequence outlined below to create Digital Logic Systems
    - Use the Xilinx Vivado development environment to implement designs. 
    - Implement Digital Logic Systems in various forms.
    - Design via Verilog (HDL) or schematic modules using the development platform.
    - Implement digital systems designs on hardware.
- ❖ **Lab Format:** Each lab assignment will have **asynchronous online components** (accessible through Blackboard and Gradescope) and **in-person implementation** during the lab session:
1. **Asynchronous online content and assessment** –
    - All lab resources will be delivered through the lab Blackboard shell -- Students must go over the contents of the corresponding **lab assignment folder** which becomes available on Blackboard at the beginning of the week. This folder contains lab assignment resources such as: lab instructions, recorded video tutorials/lectures and other important reference materials. These resources are designed to facilitate the completion of the required lab work activities; therefore, **students must become familiar with all the content before attending their lab session.**
    - **After going through the lab assignment resources**, students need to access **Gradescope** and must complete a **Quiz** (also referred to as “Prelab”) **by the posted deadline (No extensions will be given).** **Refer to missed/late work policy.**
    - Students are expected to be proactive and complete these online academic activities and diligently keep track of their own progress.
- ✚ **Starting the second week of classes, students are expected and required to log into Blackboard and Gradescope to complete the online components of the weekly assignments.**

2. **In-person Lab Work** – After completing the online assessment quiz, students will meet with the TA during their assigned *in-person* session to complete design tasks and demonstrate their lab work. During demonstration, the TA will assess the student’s understanding of the lab assignment and implementation.
  - ✦ Starting the second week of classes, students are **required** to attend the in-person lab session, be on time and demonstrate their lab work to the TA each week.
  - ✦ **Do not leave the session without demonstrating your work/progress to the TA** → If you are unable to finish your implementation during the session by checkout time, you must show your progress to the TA before the session ends (to receive partial credit where applicable) and request to complete the demonstration during TA office hours. **If the TA approves the request, please meet with them at the agreed day/time (no further extensions will be provided for students who do not show up at the agreed day/time).**
3. **TA Office Hours** – TAs will hold office hours during the days and times posted on Blackboard. *If* students have a schedule conflict, they can request an appointment to meet with the TA at an alternate time either in person or via MS Teams. Students are encouraged to use this time to ask questions and seek guidance.
4. **Complete Online Report** – Students should obtain screen captures (screenshot) of their development environment and take notes to be able to complete and submit their report (on **Gradescope**) as evidence of lab completion.
  - ✦ Students **must** participate in the in-person lab session and go through the **demonstration** of work with the TA to **validate** the submission of the report.
  - ✦ *If a student is not present during the in-person lab session, such student is responsible for immediately communicating with TA and agree to meet during office hours or make an appointment to **demonstrate their work before submitting a report.***

#### ❖ Technology Requirements:

- **Blackboard (BB) shell and Gradescope access** – Course content is delivered via the Blackboard Learning Management System (LMS), where you will find all our course resources, announcements, TA information, virtual offices sessions, etc. Online assignments will need to be completed and uploaded via Gradescope and Blackboard.
- **Internet connection** –Make sure to have internet connection that allows you to access documents, videos, and other resources from the Blackboard shell, complete online assignments, as well as upload and submit documents and videos.
- **@miners e-mail account** – Official class communication should be using this domain.
- Access to a **laptop/desktop computer** – Outside of lab sessions, students will be able to access the required software by using the ECE computer lab (located in the open section of E319) or by having a device capable of running **Xilinx VIVADO 2017\_2 (or newer)** - (*software can be downloaded and installed on personal device or accessed via VPN to a local workstation in any of the ECE on-campus Laboratories*) – instructions will be posted on Lab Blackboard.
- **Hardware-** Basys3 FPGA boards will be provided to students for use during the lab sessions.

- **PDF files** – Ability to create PDF files to upload assignments (by converting directly from Word to PDF, using a scanner or using a scanning app).

## ❖ Outline of Experiments

- There will be a total of **8 lab assignments** (*\*the number of assignments is subject to change at the discretion of the instructor to adapt to the needs of the class*).
- Labs denoted with 2 tasks will require up to 2 weekly sessions to complete and they include demonstrations during each week. Refer to Blackboard for activities description and deadlines!

Lab #	Experiment Name	Summary of Tasks
1	Implementation of Logic Gates	Test circuits for basic logic operations (AND, OR, NOT) using ICs wired on a breadboard.
2	Implementation and Simulation of Logic Expression in Vivado	<ol style="list-style-type: none"> <li>1) Simulate a given combinational logic equation in Vivado using Verilog code.</li> <li>2) Implement the logic equation into the Basys-3 FPGA board.</li> </ol>
3	Standard Forms and Logic System Design	Design, Simulate, and Implement a minimized combinational logic system for a simple alarm system. <i>Extra Credit: Implement the alarm system on a breadboard using logic ICs.</i>
4	Decimal Number to Dot System Encoder	<ol style="list-style-type: none"> <li>1) Design, Simulate, and a minimized combinational logic system for a Decimal-to-Dot encoder.</li> <li>2) Implement Decimal-to-Dot encoder. (7 seg decoder)</li> </ol>
5	Binary 4-bit adder with Register	<ol style="list-style-type: none"> <li>1) Simulate and Implement a modular 4-bit adder.</li> <li>2) Simulate and Implement a system that uses a 4-bit register and to store the output of the modular 4-bit adder.</li> </ol>
6	Counters	Design, Simulate, and Implement a 3-bit counter which loops through a given count sequence.
7	Finite State Machines (FSM)	Use knowledge of FSMs to expand the given control traffic lights design into a 4-way intersection. Simulate and Implement this new design.
8	Algorithmic State Machine (ASM) and Register Transfer Level (RTL) design	<ol style="list-style-type: none"> <li>1) Simulate a system to control the lights in a crosswalk from a given ASM chart</li> <li>2) Implement design</li> </ol>

❖ **Communication and Collaboration:**

- **Teaching Assistant (TA)**– The teaching assistant is your main point of contact regarding any lab related queries. Contact information and office hour schedule of your TA can be found on Blackboard. The TA will hold office hours several days a week and will be present in-person during the weekly lab sessions. You are advised to join the TA office session during office hours if you need any help with lab activities.
- **Classroom Etiquette/ Student Conduct** – Remember that you must be courteous, respectful, and professional in the way you address others, including classmates and TAs, either in writing (email, chat, discussion boards), or during in-person sessions. Therefore, please be mindful to provide respect and courtesy to classmates, TAs and instructors at all times. No harassment or inappropriate conduct will be tolerated.

❖ **Course Grading:** Your final grade is earned by your active participation and performance in the Lab Assignment components described below. Carefully go over this information and understand the impact of missing a lab assignment or portions of it.

**Each** of the 8 labs is worth **100 points**. The point distribution for each lab is indicated on the table below:

Point distribution for <b>each</b> Lab Assignment:	
<b>Quiz</b>	20 pts
<b>Demonstration:</b>	
<i>Design and Simulation</i>	30 pts
<i>Hardware implementation</i>	20 pts
<b>Lab Report</b>	30 pts
<b>Total</b>	<b>100 pts</b>

Grading will be based on the standard scale given on the table below as **percentage** or as accumulated **points based on 8\* lab assignments** (*\*the number of assignments is subject to change at the discretion of the instructor to adapt to the needs of the class*):

Percentage	Points	Letter
90%-100%	720-800	<b>A</b>
80%-89%	640-719	<b>B</b>
70%-79%	560-639	<b>C</b>
60%-69%	480-559	<b>D</b>
Below 59%	Below 480	<b>F</b>

❖ **Lab Work Guidelines:** Each lab assignment is divided into three important parts: **Quiz**, **Demonstration**, and **Lab Report**:

1. **Quiz** (*also referred to as Pre-lab*):

- Reading material and/or video explanations **required** to successfully complete the quiz will be provided on the appropriate lab assignment folder in Blackboard at the beginning of the week.
- The quiz consists of a set of **short questions** which will assess your understanding of the reference material.
- Students must access **Gradescope** to complete and submit this quiz to demonstrate proper preparation for the in-person lab session activities.
- The quiz must be completed on **Gradescope** by the **due date**, **no extensions will be granted**. *Refer to missed/late work policy.*

## 2. Demonstration (Design, Simulation, and Hardware Implementation):

- A set of **design, software simulation, and hardware implementation** tasks need to be completed and documented.
- Instructions for the tasks will be provided through the Lab Assignment document (located on Blackboard) along with the necessary reading material and/or video explanations. Students **must** go through all these resources **on their own before attending their lab session.**
- Students are expected to complete the *design task* **during the lab session.** The TA will start the session by providing guidance and making reference to the available material.
- **During the in-person labs sessions, students must complete the demonstration** by presenting the design, software simulation, and hardware implementation to the TA **before the end of the session:**
  - *If you are not able to completely finish all parts of the demonstration, **do not leave the session without showing your current progress to the TA** (to be able to receive full or partial credit). Before leaving, discuss with the TA if you will be able to complete the demonstration during office hours and acknowledge your understanding of any indicated conditions such as:*
    - **Date and time limit to complete the demonstration** (most demonstrations will need to be completed before the next lab assignment to avoid falling behind)
    - **Late demonstration penalty** (if applicable)
- The completion of the task(s) needs to be documented through a set of screenshots (intermediate steps and final results). **Students should collect these images while implementing design so they can be included in the report.**
  - *Even if you are not able to complete the tasks successfully, you should still take screenshots of your progress and include those in your report.*

## 3. Lab Report:

- The final item for each lab assignment summarizes the work done and shows the results obtained from the experiment.
- Students are required to access the corresponding **Lab Report** assignment on **Gradescope**, fill out all the sections, answer questions and upload any needed files. Reports must be completed by the **due date (3 working days after demonstration session)**. **Students are highly encouraged not to miss the posted deadlines.**
  - **Late submission (with penalty)→** In case a student misses the report deadline, the upload link will remain open for only 3 extra days (72 hrs) after the deadline to allow **late submission**. But please note that any report submitted after the official deadline **will be marked as late and points will be deducted for each day that the report is late** (proportional penalty for each day).

## ❖ **GENERAL COURSE POLICIES:**

- **ATTENDANCE** - Attendance **is mandatory** and it is the key to your success in the lab. Students are **required** to attend their corresponding weekly lab section and be on time.
  - Consecutive unannounced absences may result in the student being dropped from the lab.
  - Students who consistently arrive late to the lab session may not receive extensions to

complete lab work.

- Students who leave the session **without** notifying the TA or leave before completing the demonstration will **not** be allowed to request demonstration extension.
- **PREPAREDENES** --Students **must** attend their in-person lab sessions well prepared: this means you must review resources such as handouts, solutions and instructions **\*before\*** the session.
- **LAB WORK TASK COMPLETION:** Any lab work must be successfully completed to be eligible for full credit. Make sure to study all the resources provided on Blackboard for a particular experiment before attempting the tasks. If you are struggling with a task, consult your TA during lab sessions, office hours, or over email.
- **MISSED/LATE WORK POLICY** - Late submissions **might** be accepted but they are **subject to a late penalty deduction proportional to the delay**. If needed, students must discuss the situation with the TA as soon as possible and **if** the reason for **missing an assignment or for requesting late submission** is considered valid, the TA will state the appropriate late penalty (if applicable) and can approve a **DEADLINE EXTENSION** (see below).
- **DEADLINE EXTENSION POLICY:** All lab work should be submitted by the indicated deadline. Extensions *may* be granted in the case of a **documented** emergency or extenuating circumstance that can cause a student to miss a deadline. To request an extension for a particular lab work item, the student **must notify the TA immediately** (ideally before missing the deadline, or soon after).
  - **If** the circumstance warrants an extension **approved** by the TA, the student will need to provide **written** proof of illness or emergency, legal, military, or work justification. Note that **you may be asked to make-up work in a different format than the original work** (e.g. **Make-up Quizzes will take place in-person proctored by the TA**)
  - If you miss an assignment and the reason is **not** considered excusable, you will receive a zero. It is therefore important to reach out to the TA -in advance if at all possible— and explain why you might miss the deadline to a particular lab work item.
  - Once a deadline has been established for a missed item, no further extensions or exceptions will be granted for that same missed item.
- **Any document or image submitted for this lab must be in the PDF format.** This includes all (scanned) handwritten work, drawings, screenshots, and computer composed documents. If you need help creating PDF documents, please contact the TA.
- **Any handwritten/drawn work** that is scanned and uploaded must be neatly organized and clearly legible. All diagrams must be uncluttered and appropriately annotated. Any written work must have proper grammar and spelling.
- While collaboration in solving the tasks and troubleshooting problems is accepted and encouraged, **any submitted work** (written answers, comments, drawings, video, code, software files, etc) **must be your own**. Refer to **Academic Dishonesty** policy below.
- Samples of student work will be collected for quality assurance purposes. Please notify the professor, in writing, if there is any confidentiality requirement about any work that is submitted.
- All work must have good presentation to be eligible for full credit.

- ❖ **TECHNICAL DIFFICULTIES POLICY:** It is strongly suggested that you submit your work with plenty of time to spare in the event that you have a technical issue with the course website, network, and/or your computer. It is also suggested that you save a copy of all submitted/uploaded work. If you are experiencing difficulties, take a screenshot that shows the problem faced, contact UTEP's technical support and email if necessary.
  - **Technical Support:** Please follow this link for [Blackboard Student Orientation](#) to review/learn how to post assignments, participate in discussions, [take a test on Blackboard](#), review feedback/grades, etc. If you need technical support with Blackboard, please contact UTEP's Help Desk at (915)747-4357 (HELP), [helpdesk@utep.edu](mailto:helpdesk@utep.edu). For help with equipment, internet access and tech support please visit <https://www.utep.edu/technologysupport/learningremotely.html>
  
- ❖ **COPYRIGHT STATEMENT FOR COURSE MATERIALS:** All materials used in this laboratory (such but not limited to recordings, assignments, handouts, quizzes) are protected by copyright law. The course materials are only for the use of students currently enrolled in this course and only for the purpose of this course. **You may not further disseminate (i.e., share, send or post) any class materials/resources outside of this course. Doing so may result in disciplinary action.**
  
- ❖ **ACADEMIC DISHONESTY:** As an entity of The University of Texas at El Paso, the Department of Electrical and Computer Engineering is committed to the development of its students and to the promotion of personal integrity and self-responsibility. The assumption that a student's work is a fair representation of the student's ability to perform forms the basis for departmental and institutional quality. All students within the Department are expected to observe appropriate standards of conduct. **Acts of scholastic dishonesty** such as cheating, plagiarism, collusion, the submission for credit of any work or materials that are attributable in the whole or in part to another person, taking an examination for another person, any act designed to give unfair advantage to a student, or the attempt to commit such acts **will not be tolerated**. Any case involving academic dishonesty will be referred to Office of Community Standards (formerly known as the Office of Student Conduct and Conflict Resolution). For more information visit <https://www.utep.edu/student-affairs/standards/>
  
- ❖ **ACCOMMODATIONS POLICY ~ Center for Accommodations and Support Services (CASS):** Students requiring unique accommodation must contact and register with the CASS office and student must **make sure to talk to the TA or instructor at the beginning of the semester** to discuss necessary arrangements, go over procedures and avoid any miscommunication issues. The CASS office may be contacted at 747-5148, [cass@utep.edu](mailto:cass@utep.edu) or go to Room 106 Union East Building.
  
- ❖ **DEAD DAY** - In general, no classes are held on this day, **except for lab sessions or classes** which meet once a week. This means **that if a lab session falls on dead day, such lab session will be conducted as usual.**
  
- ❖ **COVID-19 PRECAUTIONS:** If you are experiencing COVID-19 symptoms, wearing a mask during in-person sessions, particularly when in close quarters or crowded settings, is highly encouraged. Details about COVID-19 testing and reporting at UTEP can be found at the following links:
  - <https://www.utep.edu/chs/covid-testing/index.html>
  - <https://www.utep.edu/ehs/covid/>