

**University of Texas at El Paso**  
**EE 2169 – Lab for Digital Systems Design I**  
**Syllabus – Lab Policies and Guidelines**  
**Lab Section for students in: Non-EE 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 class.
  - **Lab Sessions:** **Every week**, students are **expected and required** to log into **Blackboard and Gradescope** to go over the Lab Assignment information, access the corresponding resources, complete the weekly lab work in their own time, **and meet all the submission deadlines**. Some tasks and extra credit work will require students to visit the ECE campus lab (E319) during the scheduled lab session or to attend the virtual classroom (via Zoom).
  - **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 or LabView development environments to implement designs.
    - Implement Digital Logic Systems in various forms.
    - Design via Verilog (HDL) or schematic modules using the development platform.



❖ **Lab Format:** The delivery format of EE2169 lab is **hybrid** with *asynchronous online components* and an assigned lab session intended to give students the **\*option\*** to demonstrate their work in-person during this assigned time. Starting with the second week of classes, students are **expected and required** to log into Blackboard and Gradescope **every week** and complete the instructions of the weekly assignments. Each **Lab Assignment** requires **the completion of tasks and submission of 3 items submitted online: (1) QUIZ, (2) DEMONSTRATION** of lab work by uploading short video clips and **(3) ONLINE REPORT**. Make sure to meet the posted deadlines and monitor your own progress, especially as you work on the asynchronous activities:

- **Accessible asynchronous 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 the lab Blackboard shell 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.
  - Students will be able to access resources (lab assignments, recorded video lectures, and

other provided materials) in their own time and work at their own pace. **Students are responsible for managing their time appropriately to meet the posted deadlines.** Please be proactive and complete the lab work by diligently keeping track of your own progress.

- **After going through the lab assignment resources**, students need to access **Gradescope** and **must** complete the **QUIZ** (also referred to as “Prelab”) **by the posted deadline (No extensions will be given)**. Refer to missed/late work policy.
- *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.*

• **DEMONSTRATION of work** -- Students have the **option** to **demonstrate** their lab work by **uploading short video clips** on Blackboard **or** in-person by meeting with the Teaching Assistant during the lab session in which they registered (*resources are available on a first-come first serve basis*). Attending the lab session is completely **optional**. The purpose of this scheduled session is:

- a) To provide students with access to the computer lab at E319.
- b) To have time with the TA to ask questions and seek guidance about the lab assignment.
- c) To **demonstrate lab work in-person**. – Students can choose to demonstrate their lab work **in-person** to the TA (*instead of submitting a demonstration video*) during the session in which they are enrolled. Additionally, students who demonstrate in-person will also have the opportunity to earn **extra credit if they successfully implement their designs on FPGA hardware**. *Students are encouraged to bring their own laptops to demonstrate their lab work.*

• **TA Office Hours** – TAs will hold office hours throughout the week 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.**

• **Complete ONLINE REPORT** – Students should obtain screen captures (screenshots) 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 complete demonstration of work (by uploading the demo video or in-person demonstration with the TA) to validate the submission of the 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 classroom** (Zoom link will become available **only** when there is an announcement to attend a virtual session during the designated lab session). Assignments will need to be completed and uploaded via **Gradescope** and **Blackboard**.
- **Internet connection** – Make sure to have internet connection that that allows accessing documents, videos, and other resources from the Blackboard shell, completing online assignments, as well as uploading and submitting documents and videos. Although not

mandatory, the connection should ideally be stable enough to support one-on-one video conferencing via Blackboard sessions with TAs during Virtual Office hours.

- **@miners e-mail account** – Official class communication should be using this domain.
- Access to a **laptop/desktop computer** – Device should be enabled with webcam, microphone, and ability to install required software. *Most tablets do not fulfill all the requirements.* The device should be capable of running **Xilinx VIVADO 2017\_2 (or newer)** and **LabVIEW 2017 (or newer)**. *All the required software can be downloaded and installed on a personal device or accessed via VPN to a local workstation in the ECE on-campus laboratory.* Access instructions and timings are available on Blackboard.
- **Video recording capability** – Ability to record short video clips using a smartphone or other screen recording software to document successful completion of lab work.
- **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 Lab Work

- 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. Refer to Blackboard for activities description and deadlines!

| Lab # | Experiment Name   | Summary of Tasks  |
|-------|---|---|
| 1     | Implementation of Logic Gates                               | Simulate the operation of basic logic gates (AND, OR, NOT) in LabVIEW using schematic capture.  |
| 2     | Implementation and Simulation of Logic Expression in Vivado | <ol style="list-style-type: none"> <li>1) Simulate a combinational logic equation in Vivado using Verilog code.</li> <li>2) Simulate the same combinational logic equation in LabVIEW using schematic capture.</li> </ol> <p><i>Extra Credit: (On campus at E319 lab) Implement the logic equation into the Basys-3 FPGA board.</i></p> |
| 3     | Standard Forms and Logic System Design                      | Design and Simulate a minimized combinational logic system for a simple alarm system.   |
| 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 a modular 4-bit adder.</li> <li>2) Simulate a system that uses a 4-bit register and to store the output of the modular 4-bit adder.</li> </ol>   |
| 6     | Counters  | Design and Simulate 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** – The teaching assistant is your main point of contact regarding any lab related queries. Contact information and the office hour schedule of your TA is posted on Blackboard. The TA will hold office hours several days a week and will be present in-person during the weekly (optional) lab sessions. You are advised to join the TA office session during office hours if you need any help with lab activities. At other times, you may contact the TA through Microsoft Teams or via email.
- **Classroom NetEtiquette/ Student Conduct** – Remember that you must be courteous, respectful, and professional in the way you address others; either in writing (email, chat, discussion boards), or during office hours with instructor and lab TAs. Harassment or inappropriate conduct online or in-person will not be tolerated.  
Blackboard is not a public internet venue; all postings to it should be considered private and confidential. Whatever is posted in these online spaces is intended for classmates and instructor only. Please do not copy documents and paste them to a publicly accessible website, blog, or other space. If students wish to do so, they have the ethical obligation to first request the permission of the writer(s).

❖ **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>                               | 40 pts         |
| <b>Lab Report</b>                                  | 40 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 is divided into three important tasks: **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. **Design and Demonstration:**

- A set of **design** and **software simulation** tasks that need to be completed and documented.
- Instructions for the tasks will be provided through a Lab Assignment document for each lab in Blackboard along with necessary reading material and/or video explanations.
- Students are expected to complete the design task using the reference material and ask for guidance from the TA if required (during office hours, or during the optional lab session)
- Students are then expected to use the appropriate software tool to complete all the simulations tasks. All required software is available on the UTEP E319 lab computers. Access instructions and timings are available on Blackboard.
- The successful completion of the task(s) needs to be documented through:
  - a) A set of **screenshots** of intermediate steps and final results (to be included in report).
  - b) A short **video clip** (2 minutes or shorter) demonstrating the final result and/or selected intermediate steps (to be specified in Lab Assignment document). **There is a 10% points bonus on this task for demonstrating the lab work to the TA in-person during the optional lab sessions, instead of submitting a video clip. To be eligible, this in-person demo has to be presented in a lab session before the demo video deadline.**
- The recorded video clip must be uploaded using the appropriate link on **Blackboard** in order to get points for this task. *Even if you are not able to complete all the tasks successfully, you should still upload a video clip explaining your challenges (to receive full or partial credit) and how you would fix any issues if you had more time.*

3. **Lab Report:**

- The final item for each lab assignment summarizes the work done and 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 documents/files. Reports must be completed **by the due date (3 working days after demonstration deadline)**. **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:**

- **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.
- All lab work should be submitted by the deadline indicated (**all times are local El Paso–Mountain Standard Time zone**).
- **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**, please 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/>