



## **PHYS 332L - Electronics Lab**

COURSE SYLLABUS: Spring 2025

### **INSTRUCTOR INFORMATION**

Instructor: Dr. Heungman Park, Associate Professor of Physics and Astronomy

Office Location: Science Building room 240

Office Hours: [Tuesday, Thursday: 9:30 AM - 12:00 PM] or by appointment

Office Phone: 903-886-8654

Office Fax: 903-886-5480 (Department of Physics and Astronomy)

University Email Address: heungman.park@tamuc.edu

Preferred Form of Communication: email

Communication Response Time: within 48 hours

### **COURSE INFORMATION**

Materials – Textbooks, Readings, Supplementary Readings

1. Textbook(s) required:

Practical Electronics for Inventors, Fourth Edition, Paul Scherz (Author), Simon Monk (Author), ISBN-13: 978-1259587542

2. Textbook(s) recommended: optional

Digital Fundamentals, 11th Ed. by T. Floyd, ISBN: 978-0-13-273796-8  
, or Digital Fundamentals, 10th Ed. by T. Floyd

2. No lab manual is required (to be provided for free of charge).

3. Software Required: none

### **Course Description**

This is the experimental laboratory component of the main course, PHYS-332 (Electronics for Scientists and Engineers). It provides an introduction to Boolean logic, digital circuits, and digital integrated circuits, with intensive laboratory instruction in basic digital instrumentation and circuit design tools.

Prerequisites: PHYS 1402 or PHYS 2426.

### **Student Learning Outcomes**

1. Develop a strong knowledge of analog and digital electronics.
2. Understand the functionality of logic gates, Boolean expressions, simplifying digital circuits, combinational and sequential circuits.

3. Demonstrate using a hands-on (lab) approach to the applications of the concepts taught in the class.
4. Understand how digital signals are used to transmit analog information.
5. Utilize a digital interface between electronic circuits and computers.

## **COURSE REQUIREMENTS**

### **Minimal Technical Skills Needed**

Basic knowledge in electricity and electric circuits.

### **Instructional Methods**

The course focuses on introduction of digital electronics with intensive lab activity. The lectures are provided for building basic knowledge in digital electronics and lab experiments. Students will learn how to build simple digital circuits and understand how digital calculators and computers work using electricity.

### **Student Responsibilities or Tips for Success in the Course**

Students must check a course website. All assignments are posted on the course website.

## **GRADING**

The lab course is a part of the main course (PHYS-332). Final grades in this course will be based on the following scale:

A = 90%-100%

B = 80%-89%

C = 70%-79%

D = 60%-69%

F = 59% or Below

### **Grading Procedure**

- Attendance: 5 %, Lab: 20 %, Homework: 10 %, Quiz: 10 %
- Exam 1: 5%, Exam 2: 15%, Exam 3: 15%, Comprehensive final exam: 20%

\* The scales can be adjusted by the instructor. The final grading policy will be announced before the final exam.

## **TECHNOLOGY REQUIREMENTS**

### **LMS**

All course sections offered by East Texas A&M University have a corresponding course shell in the myLeo Online Learning Management System (LMS). Below are technical requirements

LMS Requirements:

<https://community.brightspace.com/s/article/Brightspace-Platform-Requirements>

LMS Browser Support:

[https://documentation.brightspace.com/EN/brightspace/requirements/all/browser\\_support.htm](https://documentation.brightspace.com/EN/brightspace/requirements/all/browser_support.htm)

YouSeeU Virtual Classroom Requirements:

## ACCESS AND NAVIGATION

You will need your campus-wide ID (CWID) and password to log into the course. If you do not know your CWID or have forgotten your password, contact the Center for IT Excellence (CITE) at 903.468.6000 or [helpdesk@tamuc.edu](mailto:helpdesk@tamuc.edu).

**Note:** Personal computer and internet connection problems do not excuse the requirement to complete all course work in a timely and satisfactory manner. Each student needs to have a backup method to deal with these inevitable problems. These methods might include the availability of a backup PC at home or work, the temporary use of a computer at a friend's home, the local library, office service companies, Starbucks, a TAMUC campus open computer lab, etc.

## COMMUNICATION AND SUPPORT

If you have any questions or are having difficulties with the course material, please contact your Instructor.

### Technical Support

If you are having technical difficulty with any part of Brightspace, please contact Brightspace Technical Support at 1-877-325-7778. Other support options can be found here:

<https://community.brightspace.com/support/s/contactsupport>

### Interaction with Instructor Statement

The instructor will respond within 24 hours by email. Each graded assignment and test will be returned within a week.

## COURSE AND UNIVERSITY PROCEDURES/POLICIES

### Course Specific Procedures/Policies

#### General Classroom & Lab Policies

No food is allowed during the class except for beverages.

No food, no drink, no open-toe shoes, no short pants in the lab.

Students are expected to be on time and present for all class meetings. If an emergency results in an absence, the student should contact the instructor as soon as possible informing the instructor of the emergency and inquiring about ways to make up the missed class. The instructor will make judgment on how to handle the situation. Possible reasons for excused absence are listed in the "Student's Guidebook" under class attendance policy. Attendance and tardy records will be maintained and both may result in deductions from your overall grade. Five unexcused absences will automatically result in a failing grade.

**Homework:** Each student must solve the assigned homework problems on his/her own time. Collaboration is encouraged, but students must understand what they did on the work and be able to explain it to the instructor. If only answers are shown, no credits may be given.

**Penalties of Late Work:** 20 % deduction within 48 hours and no credits after then.

**Exams:** There will be three midterm exams and a comprehensive final exam. Make-up exams will only be allowed for excused absences such as sickness with a doctor's note and jury duty. Only one make-up exam is allowed. The final exam must be taken.

**In-class Quiz:** A quiz will be given once or twice a week. Quiz contents will be announced during the lecture.

### **Syllabus Change Policy**

The syllabus is a guide. Circumstances and events, such as student progress, may make it necessary for the instructor to modify the syllabus during the semester. Any changes made to the syllabus will be announced in advance.

## **University Specific Procedures**

### **Student Conduct**

All students enrolled at the University shall follow the tenets of common decency and acceptable behavior conducive to a positive learning environment. The Code of Student Conduct is described in detail in the [Student Guidebook](#).

<http://www.tamuc.edu/Admissions/oneStopShop/undergraduateAdmissions/studentGuidebook.aspx>

Students should also consult the Rules of Netiquette for more information regarding how to interact with students in an online forum: <https://www.britannica.com/topic/netiquette>

### **TAMUC Attendance**

For more information about the attendance policy please visit the [Attendance](#) webpage and [Procedure 13.99.99.R0.01](#).

<http://www.tamuc.edu/admissions/registrar/generalInformation/attendance.aspx>

<http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/13students/academic/13.99.99.R0.01.pdf>

### **Academic Integrity**

Students at East Texas A&M University are expected to maintain high standards of integrity and honesty in all of their scholastic work. For more details and the definition of academic dishonesty see the following procedures:

[Undergraduate Academic Dishonesty 13.99.99.R0.03](#)

<http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/13students/undergraduates/13.99.99.R0.03UndergraduateAcademicDishonesty.pdf>

[Graduate Student Academic Dishonesty 13.99.99.R0.10](#)

<http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/13students/graduate/13.99.99.R0.10GraduateStudentAcademicDishonesty.pdf>

## **Students with Disabilities-- ADA Statement**

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you have a disability requiring an accommodation, please contact:

### **Office of Student Disability Resources and Services**

East Texas A&M University

Gee Library- Room 162

Phone (903) 886-5150 or (903) 886-5835

Fax (903) 468-8148

Email: [studentdisabilityservices@tamuc.edu](mailto:studentdisabilityservices@tamuc.edu)

Website: [Office of Student Disability Resources and Services](#)

<http://www.tamuc.edu/campusLife/campusServices/studentDisabilityResourcesAndServices/>

## **Nondiscrimination Notice**

East Texas A&M University will comply in the classroom, and in online courses, with all federal and state laws prohibiting discrimination and related retaliation on the basis of race, color, religion, sex, national origin, disability, age, genetic information or veteran status. Further, an environment free from discrimination on the basis of sexual orientation, gender identity, or gender expression will be maintained.

## **Campus Concealed Carry Statement**

Texas Senate Bill - 11 (Government Code 411.2031, et al.) authorizes the carrying of a concealed handgun in East Texas A&M University buildings only by persons who have been issued and are in possession of a Texas License to Carry a Handgun. Qualified law enforcement officers or those who are otherwise authorized to carry a concealed handgun in the State of Texas are also permitted to do so. Pursuant to Penal Code (PC) 46.035 and East Texas A&M University Rule 34.06.02.R1, license holders may not carry a concealed handgun in restricted locations.

For a list of locations, please refer to the [Carrying Concealed Handguns On Campus](#) document and/or consult your event organizer.

Web url:

<http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/34SafetyOfEmployeesAndStudents/34.06.02.R1.pdf>

Pursuant to PC 46.035, the open carrying of handguns is prohibited on all East Texas A&M University campuses. Report violations to the University Police Department at 903-886-5868 or 9-1-1.

## **East Texas A&M University Supports Students' Mental Health**

The Counseling Center at East Texas A&M University, located in the Halladay Building, Room 203, offers counseling services, educational programming, and connection to community resources for students. Students have 24/7 access to the Counseling Center's crisis assessment services by calling 903-886-5145. For more information regarding Counseling Center events and confidential services, please visit [www.tamuc.edu/counsel](http://www.tamuc.edu/counsel)

# Artificial Intelligence Software Usage Policy

East Texas A&M University acknowledges that there are legitimate uses of Artificial Intelligence, ChatBots, or other software that has the capacity to generate text, or suggest replacements for text beyond individual words, as determined by the instructor of the course.

Any use of such software must be documented. Any undocumented use of such software constitutes an instance of academic dishonesty (plagiarism).

Individual instructors may disallow entirely the use of such software for individual assignments or for the entire course. Students should be aware of such requirements and follow their instructors' guidelines. If no instructions are provided the student should assume that the use of such software is disallowed.

In any case, students are fully responsible for the content of any assignment they submit, regardless of whether they used an AI, in any way. This specifically includes cases in which the AI plagiarized another text or misrepresented sources.

13.99.99.R0.03 Undergraduate Academic Dishonesty  
13.99.99.R0.10 Graduate Student Academic Dishonesty

## COURSE OUTLINE

The course schedule is subject to change.

Lecture and Lab Schedule				
Week 1	1/13/2025	-	1/17/2025	Review: Basic concepts of electrostatics and electronic circuits
Week 2	1/20/2025	-	1/24/2025	Semiconductor PN junction, diodes, LEDs, RC circuit Hands-on activities: Understanding a potentiometer and measuring resistant change between pins of a potentiometer.
Week 3	1/27/2025	-	1/31/2025	Chapter 1: Introductory concepts Hands-on activities: Understanding a breadboard and building simple circuits on a breadboard. Charging and discharging capacitors and measuring their voltages. Using a multimeter as a continuity tester.
Week 4	2/3/2025	-	2/7/2025	Chapter 2: Number systems (Exam1) Hands-on activities: Measuring input/output voltage through an inverter gate, AND gate, OR gate chips.
Week 5	2/10/2025	-	2/14/2025	Chapter 3: Logic gates Hands-on activities: using a function generator and oscilloscope. Building a function generator with a 555 timer chip with a capacitor. Controlling the frequency of the 555 timer function generator with various capacitors.
Week 6	2/17/2025	-	2/21/2025	Chapter 4: Boolean algebra and logic simplification 1 Hands-on activities: Building a window alarm system with a voltage divider, LEDs, resistors and an AND gate chip.
Week 7	2/24/2025	-	2/28/2025	Chapter 5: Combinational logic analysis (Exam 2) Hands-on activities: Converting an analog signal with a voltage divider into a digital signal with an inverter.

Week 8	3/3/2025	-	3/7/2025	Chapter 6: Functions of combinational logic 1 Hands-on activities: Displaying a number with LEDs with multiple voltage controls.
Week 9	3/10/2025	-	3/14/2025	<b>Spring Break</b>
Week 10	3/17/2025	-	3/21/2025	Chapter 6: Functions of combinational logic 2 Hands-on activities: Understanding resistance change by light with a photocell. Measuring voltages of a photocell with/without light. Building an automatic light sensor with an LED indicator. Building a circuit for an application of a liquid level sensor for a Pancake syrup factory.
Week 11	3/24/2025	-	3/28/2025	Chapter 7: Latches, flip-flops, and timers (Exam 3) Hands-on activities: Understanding relays. Applying voltages to a relay to control ON/OFF states. Building a high current control circuit with a halogen bulb.
Week 12	3/31/2025	-	4/4/2025	Arduino digital circuits 1 Hands-on activities: Controlling multiple LEDs on a breadboard. Duty cycle control to change LED brightness. Building a blinking Christmas Tree with LEDs.
Week 13	4/7/2025	-	4/11/2025	Arduino digital circuits 2 Hands-on activities: Understanding RGB LEDs and applying different time intervals to make different colors for an RGB LED.
Week 14	4/14/2025	-	4/18/2025	Arduino digital circuits 3 Hands-on activities: Understanding temperature-dependent resistance with a thermostat. Measuring voltage change by changing the temperature of a thermostat. Building a temperature sensor with a thermistor and a resistor for a thermometer.
Week 15	4/21/2025	-	4/25/2025	Arduino digital circuits 4 Hands-on activities: Building a digital calculator for addition with IC chips.
Week 16	4/28/2025	-	5/2/2025	Comprehensive circuits
Week 17	5/5/2025	-	5/9/2025	<b>Final exam</b>