

Digital Electronics (DE)

Seth Harper/Blane Krause

2022-23 Course Syllabus

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Office Hours: 7:30 – 7:45 a.m. or 2:00 – 3:15 p.m., or by appointment

COURSE DESCRIPTION: This course, designed by *Project Lead The Way* (PLTW), provides a foundation for students who are interested in electrical engineering, electronics, and circuit design. It provides a basic overview of the design of digital circuits. It also familiarizes students with topics such as combinational and sequential logic. The student will be exposed to circuit design tools used in industry, including logic gates, integrated circuits, and programmable logic devices. By taking DE, the student will have a better understanding of the careers and areas within the business where they might thrive.

INSTRUCTIONAL PHILOSOPHY: This course is based on a series of activities and projects that reinforce the electronics field. Students will utilize materials developed for and utilized by industry professionals. The focus of the materials is to prepare the student in a sequential process that takes them through the development of the design process. Since the coursework is collegiate-level and focuses on current industry standards, professional conduct at all times is required.

ESSENTIAL STANDARDS:

1. Identify many of the common components used in electronics.
2. Understand the significance of the base 2 number system in digital electronics.
3. Characterize and troubleshoot circuits through calculations and measurements.
4. Translate a set of design specifications into a functional AOI combinational logic circuit following a formal design process.
5. Evaluate and determine when alternative design strategies are beneficial to a circuit's design or design process.
6. Describe and demonstrate how programmable logic devices (PLDs) are used in industry to design larger circuits that would be difficult or time consuming to breadboard.
7. Implement commonly used sequential circuit designs to execute tasks used regularly in electronics.
8. Design and implement common types of synchronous and asynchronous counters used in electronics and recognize where these types of counters might be applied in a digital circuit.
9. Use the design process associated with state machines to create a state machine design and implement the circuit.
10. Recognize and relate how microcontrollers represent the next evolution in circuit design to control real world systems.

MAJOR ASSIGNMENTS/PROJECTS:

1. Daily Work/Quizzes/Tests
2. Majority Vote
3. Fireplace Control Circuit
4. Date of Birth
5. Now Serving Display
6. Sixty Second Timer
7. Copier Jam
8. Phone Number
9. Tollbooth
10. PLTW End of Course Exam

ASSESSMENT PLAN: Daily and weekly formative assessments will be used to identify whether students are attaining the essential learning targets on a daily basis. Online quizzes, skills exams, and knowledge exams will be utilized to prepare students for the PLTW End of Course (EOC) exam. Summative assessments will be given, including a comprehensive final at the end of the course that shows achievement of the essential standards and concepts accomplished.

DUAL CREDIT OPPORTUNITIES: Offered to eligible students according to the Coordinating Board of Higher Education through University of Central Missouri. Students must [apply to UCM](#), then [enroll](#) in

- a. ENGT1010: Applied Electronics with lab (3 hours and 1 hour lab college credit)
- b. ENGT1050: Digital Principles and Applications (2 hours and 1 hour lab college credit)*

*required for students in the MIC program

Enrollment deadlines: **Fall – 9/3/22** **Spring – 1/28/23** Cost: \$92 per credit hour

GRADING POLICY: Grades will be figured using the Summit Technology Academy approved grading scale. Grades are cumulative throughout the semester. The grade will be based on the following:

1. Classwork/Homework: 15%
2. Projects: 30%
3. Math: 10%
4. Quizzes: 15%
5. Exams: 30%

A comprehensive final exam will comprise 10% of the semester grade.

The following standardized grading scale is used for STA:

A	95 -100	C	73 - 76
A-	90 - 94	C-	70 - 72
B+	87 - 89	D+	67 - 69
B	83 - 86	D	63 - 66
B-	80 - 82	D-	60 - 62
C+	77 - 79	F	59 & below (No Credit)

Colleges use a four point system of grading (A= 4, B=3, C=2, D=1, F=0) without a minus and plus option.

TUTORING/EXTRA HELP PLAN: STA utilizes a pyramid of interventions in order to ensure students successfully meet the course requirements. Tutoring or extra help can be obtained by contacting the STA teacher through email, phone or in person. The teacher and student will agree on the arrangements.

ATTENDANCE POLICY: Regular attendance reflects dependability. The experience gained by students in the laboratory cannot be duplicated in the event of absence. **Summit Technology Academy's policy may differ from that of the sending school and will be in effect for the period of attendance at STA.** Please reference the on-line [student handbook](#) for the most current policy. Absences must be reported by parents or guardians to STA by calling 986-3413. Andrea Bisogno is the attendance secretary at STA.

A student shall be allowed no more than nine (9) absences, excused or unexcused, per semester in any one class. When a student reaches 9 days, the school will send an informational letter to the parents, regardless of prior contact by phone or conference. The letter serves as notification of the number and type of absences by the student in each class. On the tenth (10) absence, in any one class, the student will not earn credit for that class. Students will have the opportunity to work with their administrator or teacher to make up missed time prior to the end of the semester. If a student still has 10 or more absences at the conclusion of the semester the student will be required to complete an attendance waiver appeal. A waiver to maintain full credit must be submitted by the end of the semester. This waiver should include documentation of illness, funeral, or family emergency from a medical doctor, dentist, minister, or other official source. The waiver should be turned into the attendance office.

ELECTRONIC GRADEBOOK/POWER SCHOOL WEBSITE: Grades are updated on a weekly basis. The Power School website address is <https://powerschool.lsr7.org/public/>.

ACADEMIC LETTERING: Students who have earned a 94.5% or higher in a STA program for first semester and a 94.5% or higher grade at the time of the fifth grading period will receive the academic letter.

TARDY POLICY: A tardy will be issued in accordance with the student handbook. Students are on time if they are seated in the classroom at the time of the bell.

DRIVING PRIVILEGES: Driving to STA is a privilege and can be revoked at any time. Students are allowed to drive to STA as long as their sending school allows them to drive and a permit is on file. Driving permits may be revoked if a student is frequently tardy, late to school, or exhibits irresponsible driving practices upon entering, or leaving STA, etc.

ELECTRONICS POLICY: No electronics or headphones are allowed in the classroom unless being used in the educational process or as directed by the instructor. Electronics should be placed in backpacks or purses and out of sight.

DAILY MATERIALS NEEDED:

- Engineering notebook (provided by STA)
- Scientific calculator TI30X SII
- Pencil(s) and pen(s)
- Flash drive (2GB minimum)
- Folder/Binder

TECHNOLOGY: Students are required to utilize technology for various assignments. Outside computer and internet access is required.

LATE WORK: No late work is accepted.