

PLTW - Digital Electronics

Instructor: Mr. Mark Welker
Room: 314

Office Hours: Thursday: 2:40 - 4:00, All Additional By Appointment

Course Description:

Digital Electronics (DE) is the study of electronic circuits that are used to process and control digital signals. In contrast to analog electronics, where information is represented by a continuously varying voltage, digital signals are represented by two discrete voltages or logic levels. This distinction allows for greater signal speed and storage capabilities and has revolutionized the world of electronics.

The major focus of the DE course is to expose students to the design process of combinational and sequential logic design, teamwork, communication methods, engineering standards, and technical documentation. Utilizing the activity-project-problem-based (APB) teaching and learning pedagogy, students will continually hone their professional skills, creative abilities, and understanding of the circuit design process.

Digital Electronics is a high school level course that is appropriate for 10th or 11th grade students interested in exploring electronics. Other than their concurrent enrollment in college preparatory mathematics and science courses, this course assumes no previous knowledge.

Course Outline:

Unit 1: Foundations in Electronics

- Lesson 1.1: Introduction to Electronics
- Lesson 1.2: Circuit Design Process
- Lesson 1.3: Combinational Logic

Unit 3: Sequential Logic

- Lesson 3.1: Sequential Logic Circuit Design
- Lesson 3.2: Asynchronous Counters
- Lesson 3.3: Synchronous Counters

Unit 2: Combinational Logic

- Lesson 2.1: AOI Combinational Logic Design
- Lesson 2.2: Universal Gates and K-Mapping
- Lesson 2.3: Specific Combinational Logic Design
- Lesson 2.4: Introduction to PLDs

Unit 4: Controlling Real World Systems

- Lesson 4.1: Introduction to State Machines
- Lesson 4.2: Introduction to Microcontrollers

Communication Methods:

Course Website	Remind 101	Email
http://welkersclass.weebly.com	text @defa17 to 81010	mwelker@wcpss.net

While most of the lesson material is on PLTW's learning management system, my website is available to both students and parents, and includes lesson plans, updated notes on the material covered and the expectations of each week, and other supplemental material for the students.

Professional Skills:

Time Management - Students need to apply themselves on a daily basis.

Personal Motivation - Actively seeking and taking part in any undertaking relating to the chosen skill area.

Problem-Solving Ability - This course encourages and teaches students to problem solve and use critical thinking to solve problems.

Reliability/Dependability - Demonstration by the student that he/she can be relied upon to do what is expected in class and in group work. This includes

Ability to Work with Others - A variety of skills including teamwork are addressed. In this course students must work in groups on various tasks and projects for solving problems, generating ideas, stimulating critical thinking, etc. by unrestrained spontaneous participation in discussion. Students will acquire strong teamwork and communication skills throughout this course.

Cell Phone and Electronic Device Policy:

Cell phones and other electronic devices such as tablets can be of great use in the classroom setting. Students will be allowed to use such devices during designated times. Our classroom policy includes indications for student electronic device usage as follows: Red light (no devices), Yellow Light (ask permission to use your device), Green Light (Get your Devices Out and keep them visible on your desk). When devices need to be down, the instructor will request "Park your device", meaning devices should be face down on the corner of the desk.

When devices are not to be used and a student refuses to put the device away, the following procedures will occur:

Request device be put away.

Request device to sit on instructor desk for the remainder of the period.

Contact Parent & Student Referral

Grading:

Quarter 1 (40%)	Quarter 2 (40%)	Grading Scale
Engineering Notebook	25% Engineering Notebook	25% A: 90 - 100
Unit Exams	20% Unit Exams	20% B: 80 - 89
Projects / Online Portfolio	35% Projects / Online Portfolio	35% C: 70 - 79
Quizzes	10% Quizzes	10% D: 60 - 69
Midterm	10% DE Final Project	10% Below 60, Needs Resubmission
	FINAL EXAM (20%)	

Absences

Attendance is taken daily. If you are absent it is YOUR responsibility to make up any work missed. I will have an absentee folder, which will have copies of all assignments in it. Absences of 3 days or less the student will have 1 day for each day of an absence to make up work missed. Absences of more than 3 days the student will have 2 days for each day absent. Assignments (including tests) made prior to a student's absence that are due during the absence or on the day of return need to be submitted to the teacher immediately upon the student's return to school.

Tardies

It is expected that students arrive to class on time every day. If a student is late coming into class, they will be required to sign the tardy sheet upon entering and are expected to join the class quietly.

- 1st Offense – Verbal Warning
- 2nd Offense-Verbal Warning
- 3rd Offense- Phone call & lunch detention assigned

Retake & Make Up Policies:

Missing Work Due to Absence: must be turned in within 2 days of their return to receive full credit

Late Assignments: 10pts per day for assignments turned in late. Missing assignments will be accepted up to one week after interims are distributed.

Quiz & Exam Retakes:

- Write down each of the questions that were incorrect.
- Use the classroom resources to find and write down the correct answers in their notebook.
- Have parent sign the corrections
- Schedule retake with teacher (this will be during acceleration or after school –see office hours)

Course Materials:

1/4" Graph Paper Notebook	2GB+ Flashdrive	Pen & Pencil
Headphones	Donated Supplies:	

Any/All supplies that you may wish to donate are welcome. Most commonly used/needed supplies include, but are not limited to, the following: Masking tape, Rubber Bands, Cardstock, String, Pencils, Pens, Hot Glue Guns, Scissors, Tissue, Hand Sanitizer, Paper Towels, , etc.

Please Complete and Return

I have read and understand fully the information laid out in the syllabus document for my course. I will take all opportunities granted to me in order to complete my best work throughout the semester.

Student Name (Print Clearly)	Student Signature	Date
Parent / Guardian Name (Print Clearly)	Parent / Guardian Signature	Date
Parent(s) / Guardian(s) Phone & Email (Print Clearly)		