

## CTE Course Description and Standards Crosswalk

### Course Information

Course Name	Digital Electronics
Course Number	86432
Number of High School Credits	.5
Sequence or CTEPS (You must first have the Sequence or CTEPS entered into the EED-CTE system.)	Pre-Engineering
Date of district Course Revision	March 2014

### Career & Technical Student Organization (CTSO)

CTSO embedded in this sequence	Skills USA
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### Occupational Standards

Source of Occupational Standards	States Career Cluster Initiative (STEM); PLTW
Names/Numbers of Occupational Standards	SCCI; PLTW – Digital Electronics

### Registration Information

Course Description (brief paragraph – as shown in your student handbook or course list)	Digital Electronics is a course in applied logic that encompasses the application of electronic circuits and devices. Computer simulation software is used to design and test digital circuitry prior to the actual construction of circuits and devices. PLTW is supplemental to course objectives.
Instructional Topic Headings (please separate each heading by a semi-colon)	Safety; Logic Gates; Registers and Counters; Analog and Digital Waveforms; Electron Theory; Programmable Logic Devices; Microprocessors; Flip-Flop Applications

### Summative Assessments and Standards

Technical Skills Assessment (TSA)	Yes
Course addresses:	PLTW – Digital Electronics
New Alaska ELA and Math Standards	Yes
Alaska Cultural Standards	Yes
All Aspects of Industry (AAI)	Yes
Core Technical Standards	Yes
Employability Standards	Yes

### Employability Standards

Source of Employability Standards	State of Alaska
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### Tech Prep

Current Tech Prep Articulation Agreement? (Y/N)	No
Date of Current Agreement	
Postsecondary Institution Name	
Postsecondary Course Name	
Postsecondary Course Number	
# of Postsecondary Credits	

### Additional CTE Course Information

Author	
Course developed by	Revised by Mary Shreves
Course adapted from	PLTW
Date of previous course revision	May 2010 (Ralph)
Course Delivery Model	
Is the course brokered through another institution or agency? (Y/N)	No

Standards Alignment
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Student Performance Standards (Learner Outcomes or Knowledge & Skill Statements)	Specific Occupational Skills Standard	Common Technical Core Standards	New Alaska ENG/LA Standards	New Alaska Math Standards	Alaska Cultural Standards	Employability/ Career Readiness Standards	All Aspects of Industry/ Systems	Assessment
Students will use schematics and symbolic algebra learned in 1 <sup>st</sup> semester of Digital Electronics to represent digital gates in the creation of solutions to design problems.	SCC04.02.02	ST1,2,3,4,6 ST-ET1,2,3,4,5,6	SL.11-12.2 RST.11-12.10 L.9-12.6	N-Q.1,2	B:2,3,4	A:2,5	Technology Community Technical Skills	PLTW Assessments
Students will use seven-segment displays to display digits 0-9, and understand the two varieties of seven-segment displays.								
Students will understand the hexadecimal and octal number systems.	SCPA01.01 SCPA01.06 SCPA.03	ST1,2,4,5,6 ST-ET1,2,3,4,5,6	L.11-12.6 RST.9-10.4&.7 RST.11-12.7	N-Q.1-3	B2,4	A2	Technology Technical Skills	PLTW Assessments
Students will demonstrate understanding of binary addition and subtraction by implementation of cascading adders.	SCPA01.01 SCPA01.06 SCPA.03	ST1,2,4,5,6 ST-ET1,2,3,4,5	L.11-12.6 RST.9-10.4&.7	N-Q.1-3	B2,4	A2	Technology Technical Skills	PLTW Assessments

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<b>Student Performance Standards (Learner Outcomes or Knowledge &amp; Skill Statements)</b>	<b>Specific Occupational Skills Standard</b>	<b>Common Technical Core Standards</b>	<b>New Alaska ENG/LA Standards</b>	<b>New Alaska Math Standards</b>	<b>Alaska Cultural Standards</b>	<b>Employability/ Career Readiness Standards</b>	<b>All Aspects of Industry/ Systems</b>	<b>Assessment</b>
		,6	RST.11-12.7					
Students will be able to design and implement combinational logic circuits using Programmable Logic Devices.	SCPA11 SCC01 SCPA01 SCC10 SCPA10	ST1,2,4,5 ST-ET1,2,3,4,5,6	RL.11-12.4 SL.11-12.4 L.9-10.4 L.11-12.1A RST.9-10.8	S-ID.9	B2,3,4	A2,5	Technology Technical Skills Health & Safety Work Habits Planning	PLTW Assessments
Students will be able to interpret waveform diagrams from circuits they construct and compare them with combinational waveforms.	SCC03	ST1,2,4 ST-ET1,2,3,4,5,6	SL.11-12.2 L.9-12.6 RST.11-12.3,4,7,8 WHST.11-12.7	N-Q.1-3	B:2,3,4	A:2,5	Technology Community Technical Skills	PLTW Assessments
Students will understand the principles of sequential logic, and the difference between sequential logic and combinational logic.								
Students will understand and use flip-flop and latch logic devices.								
Students will use flip flops to design single event detection circuits, data synchronizers, shift registers, and frequency dividers.	SCC03	ST1,2,4,6 ST-ET1,2,3,4,5,6	SL.11-12.2 L.11-12.3.a L.9-12.6	N-Q.1-3	B:2,3,4	A:2,5	Technology Community Technical Skills	PLTW Assessments

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			RST.11-12.3,4,6,7,9,10					
Students will understand asynchronous counters and their implementation using SSI (small scale integrated) and MSI (medium scale integrated) logic gates as well as D and J/K flip flops.								
Students will understand synchronous counters and their implementation using SSI (small scale integrated) and MSI (medium scale integrated) logic gates as well as D and J/K flip flops.								
Students will understand up counters, down counters, and modulus counters, and their implementation using the synchronous counter method.								
Students will program microcontrollers to perform a variety of tasks.								
Students will participate in CTSO classroom activities.	SCC01  SCC05	ST1,2,3,4,5,6 ST-ET1,2,3,4,5,6	SL.9-10.5 L.9-12.6	S-IC.6	B:1,2,3,4 C:2,3 E:8	A:1, 2, 3, 4, 5, 7 B:1,2,3,4,5	Technical Skills Work Habits Management Labor Technology Community	Portfolio CTSO Competitions

**Instructional Resources**

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**List the major instructional resources used for this course: (websites, textbooks, essential equipment, reference materials, supplies)  
High School Engineering**

Pathway To Engineering (PTE) curriculum is designed as a four-year high school sequence. Foundation courses (Introduction to Engineering Design, Principles of Engineering, and Digital Electronics) are supplemented by a number of electives to create eight rigorous, relevant, reality-based courses. PLTW is supplemental to course objectives.