

CTE Course Description and Standards Crosswalk

Course Information

Course Name	Principals of Engineering
Course Number	86411
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 (SCCI); PLTW
Names/Numbers of Occupational Standards	SCCI, PLTW Principles of Engineering

Registration Information

Course Description (brief paragraph – as shown in your student handbook or course list)	Principles of Engineering is a course that helps students understand the field of engineering/engineering technology. Exploring various technology systems and manufacturing processes help students learn how engineers and technicians use math, science and technology in an engineering problem solving process to benefit people. The course also includes concerns about social and political consequences of technological change. PLTW is supplemental to course objectives.
Instructional Topic Headings (please separate each heading by a semi-colon)	Engineering Teams; Simple Machines; Electrical Systems; Engineering for Reliability; Technical Writing; Thermodynamics; Control Systems; Dynamics/Kinematics; Design Process; Fluid Systems; Materials and Materials Testing.

Summative Assessments and Standards

Technical Skills Assessment (TSA)	Yes
Course addresses:	Principles of Engineering
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	

DISTRICT NAME: Mat-Su Borough School District

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

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 briefly study the history of engineering, to gain an understanding of current practices as well as cultural and societal impacts.					A1, 4, B2 C3, 4		Technical Skills Community	
Students will examine the evolution of an invention to observe and report on how the design process is applied to continuously redesign and improve the product.	SCC02.02 SCC03.01.01	ST1,2,4,6 ST-ET1,2,3,4,5,6	SL.9-10.5 L.9-10.6 WHST.9-10.2.a-f,6,7	S-ID.2 S-ID.9 S-IC.6	B:2,3,4	A:1, 2, 5	Technology Community Technical Skills	PLTW Assessments
Understand that an engineering team must work together to solve problems, with each team member having individual and collective responsibilities.	SCC02.01 SCC07	ST1,2,3,4,5,6 ST-ET1,2,3,4,5,6	SL.9-10.1a-d L.9-12.6		B:1,2,3,4 C:2,3 E:8	A:1, 2, 3, 4, 5, 7	Labor Community Technical Skills	PLTW Assessments
Students will mathematically explain the mechanical advantage gained and explain the function of the six different	SCC04.02.05	ST1,2,4,6 ST-	RST.9-10.3	N-Q.1 A-CED.1,4	B:2,3,4	A:2, 5	Technology Community	PLTW Assessments

DISTRICT NAME: Mat-Su Borough School District

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
types of simple machines in a presentation on the Simple Machine Energy Transformation (SMET) device.		ET1,2,3,4, 5,6	L.9-12.6	A-REI.1			Technical Skills	ts
Students will develop an understanding of thermodynamics principles, including heat transfer, heat engines, and alternative heat systems.								
Students will develop an understanding of fluid systems, differentiating between hydraulic and pneumatic systems.								
Students will participate in a Reverse Engineering project to develop an understanding of the process of redesigning an existing product to improve and broaden its function.								
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

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 (Project Lead The Way) is supplemental to course objectives.