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CTE Course Description and Standards Crosswalk

Course Information	
Course Name	Introduction to Engineering and Design
Course Number	En&D 1
Number of High School Credits	.5
Sequence or CTEPS (You must first have the Sequence or CTEPS entered into the EED-CTE system.)	Marine Careers
Date of district Course Revision	4/10/2024
Career & Technical Student Organization (CTSO)	
CTSO embedded in this sequence	SkillsUSA
Occupational Standards	
Source of Occupational Standards	International Technology and Engineering Educators Association (ITEEA)
Names/Numbers of Occupational Standards	Standards for Technological Literacy
Registration Information	
Course Description (brief paragraph – as shown in your student handbook or course list)	Introduction to Engineering and Design (En&D) is a high school level foundation course in the Marine Careers CTEPS. In En&D students are introduced to the engineering profession and a common approach to the solution of engineering problems, an engineering design process. Utilizing the activity-project-problem-based (APB) teaching and learning pedagogy, students will progress from completing structured activities to solving open- ended projects and problems that require them to develop planning, documentation, communication, and other professional skills.
Instructional Topic Headings (please separate each heading by a semi-colon)	Career Exploration and Planning; Career, Education and Life Readiness; CAD and Drafting; Design Process; Computational and Analytical Skills
Summative Assessments and Standards	
Technical Skills Assessment (TSA)	PLTW
Course addresses:	Introduction to Engineering Design

New Alaska ELA and Math Standards	http://www.corestandards.org/
Alaska Cultural Standards	http://ankn.uaf.edu/Publications/CulturalStandards.pdf
All Aspects of Industry (AAI)	https://education.alaska.gov/tls/CTE/docs/curriculum/all-aspects-of-industry.pdf
Core Technical Standards	https://cte.careertech.org/sites/default/files/CCTC_Standards_Formatted_2014.pdf
Employability Standards (ES)	https://education.alaska.gov/tls/CTE/docs/curriculum/alaskaemployabilitystandards.pdf
Employability Standards	
Source of Employability Standards	https://careertech.org/
Tech Prep	
Current Tech Prep Articulation Agreement? (Y/N)	N
Date of Current Agreement	N/A
Postsecondary Institution Name	N/A
Postsecondary Course Name	N/A
Postsecondary Course Number	N/A
# of Postsecondary Credits	N/A

Additional CTE Course Information

Author	
Course developed by	PLTW
Course adapted from	
Date of previous course revision	
Course Delivery Model	

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Is the course brokered through another institution or agency? (Y/N)	No

Standards Alignment

Student Performance Standards (Learner Outcomes or Knowledge & Skill Statements)	Standards for Technological Literacy 9-12 Standards	Common Technical Core Standards	Common Core ENG/LA Standards	Common Core Math Standards	Next Generation Science Standards	Alaska Cultural Standards	Employ-ability Standards	All Aspects of Industry	Assessment

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Career Exploration and Planning: Make informed career decisions and manage personal career plans by researching occupations compatible with personal strengths and preferences.	1.K	7, 10, ST 3, ST 4, ST 5, ST 6	R.1, R.7, W.1, W.2, W.4, W.7, W.8, W.9, SL.2, SL.4, SL.5	MP1, MP3	SEP1, SEP 4, SEP 7, SEP 8	B.1, B.2, B.3, D.6, E.8	A.5, B.1, B.2, B.3, B.4, B.5	1, 2	Self- assessment, reflection, interaction with guest speakers
Career, Education, and Life Readiness: Demonstrate readiness to be successful in professional, educational, and personal life goals. ● Team collaboration ● Project management ● Problem-solving ● Communication skills ● Presentation skills ● Technical writing	2.EE, 4.J, 4.K	1, 3, 4, 9, 12, ST 3, ST 6	R.7, W.2, W.4, W.8, SL.1, SL.2, SL.4, SL.5, SL.6, L.6	MP1	SEP1, SEP 8	A.1, A.6, B.3, C.2, C.3, C.4, D.6, E.7	A.1, A.3, A.7, B.4, B.5	6, 7, 8	AKCIS Portfolio, resume, attendance, professionalism grade, project planning documents
CAD and Drafting Experience: ● Create and/or modify 3D solid computer models of complex parts ● Create 3D models of part assemblies ● Create technical drawings of complex parts and assemblies	1.J, 1.K, 2.CC, 12.L	2, 4, 5, 8, 11, ST 2, ST 6, ST-ET 1,	R.1, R.4, R.7, R.10, W.2, W.4, W.6, W.7,	MP 1-8, G.GMD.3, G.GMD.4, G.MG.1, G.MG.2, G.MG.3, N.Q.1, N.Q.2,	SEP 1-8,	B.4, C.4	A.2	5, 7	Free hand technical sketches, CAD engineering drawings

from 3D solid models using ● CAD software ● Apply drive constraints and simulate motion of an assembly within the 3D modeling environment ● Create concept sketches to represent ideas ● Create hand drawn technical drawings to represent a simple part that may include an isometric view, orthographic projections and a section view		ST-ET 2, ST-ET 3	SL.1, SL.2, SL.4, SL.5, SL.6, L.3, L.6	N.Q.3,					
Design Process Experience: ● Design a consumer product using an engineering design process based on a design brief ● Solve a problem using an engineering design process ● Document in detail the engineering design process used to solve a problem or design a product Create a detailed and comprehensive design brief ● Brainstorm/recommend improvements to a product based on reverse engineering ● Produce a detailed technical report to present the solution to a problem or a product design ● Describe the lifecycle of a consumer product ● Work collaboratively on a design team to design a product or solve a problem	2.W, 2.X, 2.Y, 2.Z, 2.AA, 2.BB, 2.DD, 4.I, 8.H-K, 9.I-L, 11.M-R	2, 4, 6, 8, 12, ST 1, ST 2, ST 6, ST-ET 1, ST-ET 2, ST-ET 3, ST-ET 4, ST-ET 5	R.1, R.4, R.7, R.10, W.1, W.2, W.4, W.6, W.8, W.9, W.10, SL.1, SL.2, SL.4, SL.5, SL.6, L.1, L.3, L.6	MP 1-8, G.MG.1, G.MG.3, N.Q.1, N.Q.2, N.Q.3,	SEP 1-8, HS.ETS1.2, HS.ETS1.3, HS.ETS1.4, DCI - ETS1.A, DCI - ETS1.B, DCI - ETS1.C	B.4, C.4	A.2	5, 7	Design challenges

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Computational and Analytical Skills: ● Use Excel to calculate summary	2.W, 2.Z, 2.AA,	2, 4, 7,	R.1, R.4, R.7,	MP 1-8, N.Q.1, N.Q.2,	SEP 1-8, HS.ETS1.3, HS.ETS1.4	B.4, C.4	A.2, A.6	3, 5, 7	Make and record various measurements using common
● statistics and create histograms Use Excel to find a trend line (mathematical model) to represent data and interpret the model within the context of the ● data Complete multi-step engineering ● calculations ● Make predictions based on data ● Use data to inform decisions Perform precision measurement ● using a dial caliper Convert among and between SI ● and US Customary Calculate physical properties (surface area, volume, density) of ● simple 3D forms Determine a parametric equation that describes a relationship between two quantities	4.I, 11.R, 12.L, 12.M, 12.P, 13.J-K	8, 11, ST 2, ST 6, ST-ET 1, ST-ET 2, ST-ET 3, ST-ET 5	R.10, W.2, W.4, W.6, W.7, W.8, SL.1, SL.2, SL.4, SL.5, SL.6, L.3, L.6	N.Q.3, N.VM.1, N.VM.3, A.SSE.1, A.SSE.1.a A.CED.1, A.CED.2, A.CED.3, A.CED.4, A.REI.3, A.REI.4.b, A.REI.10, F.IF.1, F.IF.2, F.IF.5, F.IF.6, F.IF.7.a, F.BF.1, F.LE.5, G.MG.1, G.MG.3, S.ID.1, S.ID.4, S.ID.6, S.ID.7, S.ID.8, S.IC.1				tools including dial calipers and spreadsheet programs; Create graphical models

Instructional Resources

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

PLTW Intro to Engineering