Principles of Applied Engineering
Scope and Sequence

STEM Cluster
2018-2019
Design Year 5

Vision for Principles of Applied Engineering Course
Principles of Applied Engineering is a 10th grade MYP Design and CTE course which provides an overview of the various fields of science, technology, engineering, and mathematics and their interrelationships. Scholars will develop engineering communication skills, which include computer graphics, modeling, and presentations, by using a variety of computer hardware and software applications to complete assignments and projects. Upon completing this course, scholars will have an understanding of the various fields of engineering and will be able to make informed career decisions. Further, scholars will have worked on a design team to develop a product or system. Scholars will use multiple software applications to prepare and present course assignments.

Year at a Glance

August	September	October	November	December	January	February	March	April	May
BREAK	Unit 1: What is Engineering?	Unit 2: Research, Drawing, and Modeling	Unit 3: Materials, Electricity, and Civil Engineering	BREAK	Unit 4: Mechanical Engineering and Robotics	Unit 5: Aerospace and Manufacturing Engineering	Unit 6: Chemical Engineering and the Profession of Engineering		BREAK

Time Frame	Unit Title	General Resource(s)
17 Class Periods	Unit 1: What is Engineering?	• Engineering Fundamental: Design, Principles, and Careers, 2nd Edition Textbook; ISBN: 978-1-63126-285-2 • Engineering Fundamental: Design, Principles, and Careers, 2nd Edition Lab Workbook; ISBN: 978-1-63126-286-9 • Principles of Applied Engineering Projects and Supply Needs word document • www.pitsco.com
9 Class Periods	Unit 2: Research, Drawing, and Modeling	
15 Class Periods	Unit 3: Materials, Electricity, and Civil Engineering (includes Common Midterm Project)	
10 Class Periods	Unit 4: Mechanical Engineering and Robotics	
10 Class Periods	Unit 5: Aerospace and Manufacturing Engineering	
22 Class Periods	Unit 6: Chemical Engineering and the Profession of Engineering (includes Common Final Project)	

Edited by Chris Lahvic, CTE Curriculum Coordinator, May 2018

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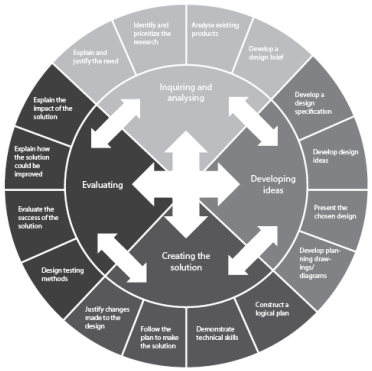

Objectives

A. Inquiring and analyzing Students are presented with a design situation, from which they identify a problem that needs to be solved. They analyse the need for a solution and conduct an inquiry into the nature of the problem. In order to reach the aims of design, students should be able to: i. explain and justify the need for a solution to a problem ii. construct a research plan, which states and prioritizes the primary and secondary research needed to develop a solution to the problem iii. analyse a group of similar products that inspire a solution to the problem iv. develop a design brief, which presents the analysis of relevant	**B. Developing ideas** Students design tests to evaluate the solution, carry out those tests and objectively evaluate its success. Students identify areas where the solution could be improved and explain how their solution will impact on the client or target audience. In order to reach the aims of design, students should be able to: i. develop a design specification, which outlines the success criteria for the design of a solution based on the data collected ii. present a range of feasible design ideas, which can be correctly interpreted by others iii. present the chosen design and outline the reasons for its selection iv. develop accurate planning drawings/diagrams and outline requirements for the creation of the chosen solution.
C. Creating the solution Students plan the creation of the chosen solution and follow the plan to create a prototype sufficient for testing and evaluation. In order to reach the aims of design, students should be able to: i. construct a logical plan, which outlines the efficient use of time and resources, sufficient for peers to be able to follow to create the solution ii. demonstrate excellent technical skills when making the solution iii. follow the plan to create the solution, which functions as intended iv. explain changes made to the chosen design and plan when making the solution v. present the solution as a whole.	**D. Evaluating** Students design tests to evaluate the solution, carry out those tests and objectively evaluate its success. Students identify areas where the solution could be improved and explain how their solution will impact on the client or target audience. In order to reach the aims of design, students should be able to: i. describe detailed and relevant testing methods, which generate accurate data, to measure the success of the solution ii. explain the success of the solution against the design specification iii. describe how the solution could be improved iv. describe the impact of the solution on the client/target audience.

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REQUIRED			EXAMPLES – May Be Altered According to School/Teacher Choice		
Time Frame	**Unit Number, Title, and Key Components**	**TEKS**	**IB Connections**	**Assessment Task(s)/MYP Objective(s)**	**Resources**
17 Class Periods	**Unit 1: What is Engineering?** **Key Components** • Engineering Defined • Role of engineers • History of Engineering • Engineering Design Process • Engineering Notebooks • Brainstorming **Prioritized Skills** Reading CRS: • 201. Locate basic facts (e.g. names, dates, events) clearly stated in a passage. Understand the implication of a familiar word or phrase and of simple descriptive language. • 202. Recognize clear cause-effect relationships described within a single sentence in a passage. Back to Table of Contents See in Calendar	1.A 1.B 1.C 1.D 1.E 2.A 2.B 2.C 2.D 3.A 3.B 3.E 4.A 4.B 4.D 4.E 4.F 4.G 5.A 5.B 5.C 5.D 9.A 9.B 9.C 9.D 9.E	**Statement of Inquiry:** Our communities and culture affect how we communicate our beliefs and values. **Key Concepts:** Communication **Related Concepts:** Evaluation **Global Context:** Identities and Relationships: beliefs and values **Approaches to Learning:** Research: Information Literacy Communication: Communication	**GOAL**: The goal of this project is to foster teamwork and collaboration amongst a diverse group of scholars by focusing on the development of ideas. **ROLE**: Scholars are teams of civil engineers and highly skilled experts in structural engineering. **AUDIENCE**: The audience will be everyone that benefits from using the earthquake tower. **SITUATION**: In recent news an earthquake has struck Mount Kinabalu in Malaysia, killing several people and destroying major towers in the nearby city. Your team of top civil engineers were hired to set the new world record for the tallest, sturdiest and best-looking earthquake tower. The tower should also be strong enough to withstand the most destructive earthquakes on earth. **PRODUCT**: You will build an earthquake proof tower made entirely of sticks and glue. Designs will be tested for structural stability, aesthetics, and height. You will present your completed project in the form of a PowerPoint presentation to include each step of the design process and pictures of the construction and completed project which will be documented each day in your engineering notebooks. **STANDARDS**: Criteria A & C A. Inquiring and analyzing C. Creating the solution	• Engineering Fundamental: Design, Principles and Careers Textbook and Workbook ○ Chapters 1-3 • Pitsco Earthquake Tower Teacher's Guide and Supplies from www.pitsco.com • (See Principles of Applied Engineering Projects and Supply Needs document on Blackboard)

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REQUIRED			EXAMPLES – May Be Altered According to School/Teacher Choice		
Time Frame	**Unit Number, Title, and Key Components**	**TEKS**	**IB Connections**	**Assessment Task(s)/MYP Objective(s)**	**Resources**
9 Class Periods	**Unit 2: Research, Drawing, and Modeling** **Key Components** • Sketching • Researching ideas • Selecting the best approach • Engineering drawings • Industry guidelines • Modeling, Testing and Final product • Engineering economics **Prioritized Skills** Reading CRS: • 301. Locate simple details at the sentence and paragraph level in uncomplicated passages. • 301. Draw simple generalizations and conclusions about people, ideas, and so on in uncomplicated passages. Back to Table of Contents See in Calendar	1.A 1.B 1.C 1.D 1.E 3.A 3.B 3.C 3.D 3.E 6.A 6.B 6.C 6.D 6.E 9.A 9.B 9.C 9.D 9.E 10.A 10.B 10.C 10.D 10.F 10.G 10.H 10.I	**Statement of Inquiry:** An individual's perspective on beauty develops based on what he or she values. **Key Concepts:** Development **Related Concepts:** Perspective **Global Contexts:** Personal and Cultural Expression: discover and express ideas, feelings, nature, culture, beliefs and values **Approaches to Learning:** Thinking: Critical Thinking, Creative Thinking	**GOAL**: The goal of this project is to foster teamwork and collaboration amongst a diverse group of scholars by allowing them to create a solution to a problem based on their perspective and values. **ROLE**: Scholars are teams of civil engineers and highly skilled experts in structural engineering. **AUDIENCE**: The audience will be everyone that benefits from using the catapults **SITUATION**: You are an ancient Greek warrior and you are the head engineer in your village. The village is worried that they are not adequately prepared for the upcoming battles with the Persian army. The villagers have come to you to help design a new catapult that is capable of completely annihilating the Persians. **PRODUCT**: Build a catapult made of balsa wood and glue. Designs will be tested for structural stability, aesthetics, and height. You will present your completed project in the form of a PowerPoint presentation to include each step of the design process and pictures of the construction and completed project which will be documented each day in your engineering notebooks. Scholars must fully justify changes made to the chosen design and plan when making the solution. **STANDARDS**: Criteria C & D C: Creating the Solution D: Evaluating the Solution	• Engineering Fundamental: Design, Principles and Careers Textbook and Workbook ○ Chapters 4-6 • Pitsco Catapults Teacher's Guide from www.pitsco.com • (See Principles of Applied Engineering Projects and Supply Needs document on Blackboard)

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REQUIRED			REQUIRED		
Time Frame	**Unit Number, Title, and Key Components**	**TEKS**	**IB Connections**	**Assessment Task(s)/MYP Objective(s)**	**Resources**
15 Class Periods	**Unit 3: Materials, Electricity, and Civil Engineering (includes Common Midterm Project)** **Key Components** • Principles of Materials • Material engineering applications • Electrical engineering principles • Civil engineering principles • Civil engineering applications • Understanding the role of engineers **Prioritized Skills** Reading CRS: • 301. Locate simple details at the sentence and paragraph level in uncomplicated passages. • 301. Draw simple generalizations and conclusions about people, ideas, and so on in uncomplicated passages. Back to Table of Contents See in Calendar	1.A 1.B 1.C 1.D 1.E 2.G 3.A 3.B 5.A 5.B 5.C 5.D 6.A 6.B 6.C 6.D 6.E 8.A 8.B 8.C 8.D 9.A 9.B 9.C 9.D 9.E	**Statement of Inquiry:** Communities function more effectively because of human-made systems. **Key Concepts:** Systems **Related Concepts:** Function **Global Context:** Globalization and sustainability: An inquiry into the interconnectedness of human-made systems and communities. **Approaches to Learning:** Social: Collaboration Thinking: Critical Thinking	**GOAL**: Scholars will be taught various ways engineers communicate solutions to problems and share their research by developing their ideas. **ROLE**: Scholar is the researcher and presenter of information. **AUDIENCE**: Fellow students interested in a possible career in engineering **SITUATION**: A land developer has purchased 100 acres of land in San Francisco, California and has contracted your engineering team to build a wind farm that can produce the greatest amount of electricity. Your challenge is to brainstorm a turbine blade that will produce the greatest amount of voltage. The developer would like you and your team to come up with a design and working model within 3 days. **PRODUCT**: Using the design cycle and research skills you will find the best design for a wind turbine blade. Your design will be tested for structural stability, aesthetics, and greatest amount of voltage produced. You will present your completed project to include each step of the design process and pictures of the construction and completed project which will be documented each day in your engineering notebooks. **STANDARDS**: Criterion A-C A: Inquiring and Analyzing B: Developing Ideas C: Creating the Solution	• Engineering Fundamental: Design, Principles and Careers Textbook and Workbook ○ Chapters 7-9 • Pitsco Wind Energy Guide from www.pitsco.com • (See Principles of Applied Engineering Projects and Supply Needs document on Blackboard)

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REQUIRED			**EXAMPLES – May Be Altered According to School/Teacher Choice**		
Time Frame	**Unit Number, Title, and Key Components**	**TEKS**	**IB Connections**	**Assessment Task(s)/MYP Objective(s)**	**Resources**
10 Class Periods	**Unit 4: Mechanical Engineering and Robotics** **Key Components** • Principles of mechanical engineering • Mechanical Power systems • Mechanical power principles and formulas • Mechanical engineering applications • Introduction to robotics • Building the VEX Clawbot • Programming the VEX **Prioritized Skills** Reading CRS: • 301. Locate simple details at the sentence and paragraph level in uncomplicated passages. • 301. Draw simple generalizations and conclusions about people, ideas, and so on in uncomplicated passages.	1.A 1.B 1.C 1.D 1.E 6.A 6.B 6.C 6.D 6.E 7.A 7.B 7.C 7.D 8.A 8.B 8.C 8.D 9.A 9.B 9.C 9.D 9.E	**Statement of Inquiry:** The impact of scientific and technological advances on society and on the environment lead to the adaptation of new developments. **Key Concepts:** Development **Related Context:** Adaptation **Global Context:** Scientific and technical innovation: the impact of scientific and technological advances on society and on the environment. **Approaches to Learning:** Social: Collaboration Thinking: Critical Thinking	**GOAL**: Scholars will be taught various ways engineers communicate solutions to problems and share their research. **ROLE**: Scholar is the researcher and presenter of information. **AUDIENCE**: Fellow students interested in a possible career in engineering **SITUATION**: The Shanghai Maglev Train, also known as the Transrapid, is the fastest commercial train currently in operation and has a top speed of 430 km/h (270 mph). The line was designed to connect Shanghai Pudong International Airport and the outskirts of central Pudong, Shanghai. It covers a distance of 30.5 kilometers in 8 minutes. They have tasked you with developing ideas for a newer faster model. **PRODUCT**: Your challenge is to set the new world record by designing a maglev vehicle that will travel down an inclined track at the fastest rate possible. You will create this vehicle to demonstrate the impact of	• Engineering Fundamental: Design, Principles and Careers Textbook and Workbook ○ Chapters 10 • Introduction to VEX robotics http://curriculum.vexrobotics.com/curriculum/intro-to-robotics.html • Pitsco MagLev Vehicles Teacher's Guide from www.pitsco.com • (See Principles of Applied Engineering Projects and Supply Needs document on Blackboard)

	Back to Table of Contents See in Calendar			scientific and technological advances on society and on the environment. **STANDARDS**: Criteria C & D C: Creating the Solution D: Evaluating the Solution	
REQUIRED			**EXAMPLES – May Be Altered According to School/Teacher Choice**		
Time Frame	**Unit Number, Title, and Key Components**	**TEKS**	**IB Connections**	**Assessment Task(s)/MYP Objective(s)**	**Resources**
10 Class Periods	**Unit 5: Aerospace and Manufacturing Engineering** **Key Components** • Aerospace engineering principles • Aerospace engineering applications • Chemical engineering principles • Characteristics and measurements • Chemical engineering applications • Chemical engineering in action **Prioritized Skills** Reading CRS: • 301. Locate simple details at the sentence and paragraph level in uncomplicated passages. • 301. Draw simple generalizations and conclusions about people, ideas, and so on in uncomplicated passages.	1.A 1.B 1.C 1.D 1.E 1.F 3.A 3.B 6.A 6.B 6.C 6.D 6.E	**Statement of Inquiry:** The constant evaluation and evolution of systems have led mankind to new discoveries, explorations and migrations of humankind. **Key Concepts:** Systems **Related Concepts:** Evaluation **Global Context:** Orientation in space and time: the discoveries, explorations and migrations of humankind. **Approaches to Learning:** Thinking: Creative Thinking Self-management: Organization	**GOAL**: Scholars will be taught various ways engineers communicate solutions to problems and share their research. **ROLE**: Scholar is the researcher and presenter of information. **AUDIENCE**: Fellow students interested in a possible career in engineering **SITUATION**: You are an aeronautical engineering working for NASA. You and your team are developing a new rocket and need to run some tests to generate data regarding the rocket's recovery system time and velocity rates. You and your team will need to construct and launch a solid-fuel rocket prototype to obtain the required data to be used in your new rocket design. During the same time the ARMY has requested a new glider plan to be designed that will allow the transport of combat troops and equipment to a combat zone. Your team has been multitasked to accomplish these two projects as quickly as	• Engineering Fundamental: Design, Principles and Careers Textbook and Workbook ○ Chapters 13 & 14. • Pitsco Rockets and Glider Teacher Guides from www.pitsco.com • (See Principles of Applied Engineering Projects and Supply Needs document on Blackboard)

	Back to Table of Contents See in Calendar			possible without sacrificing quality work. **PRODUCT**: Using the design cycle and research skills you will find the best design for a rocket and glider. Your designs will be tested for meeting the project criteria (stability, distance traveled, and aerodynamics), aesthetics, presentation and teamwork. You will present your completed project to include each step of the design process and pictures of the construction and completed project which will be documented each day in your engineering notebooks. **STANDARDS**: Criteria B & C B: Developing Ideas C: Creating the Solution	
REQUIRED			**REQUIRED**		
Time Frame	**Unit Number, Title, and Key Components**	**TEKS**	**IB Connections**	**Assessment Task(s)/MYP Objective(s)**	**Resources**
12 Class Periods	**Unit 6: Chemical Engineering and the Profession of Engineering (includes Final Common Project)** **Key Components** • Engineering as a profession • Functions of engineers • Engineering impacts • Future of engineering **Prioritized Skills** Reading CRS: • 301. Locate simple details at the sentence and paragraph level in uncomplicated passages. • 301. Draw simple generalizations and conclusions about people, ideas, and so on in uncomplicated passages.	1.A 1.B 1.C 1.D 1.E 3.A 3.B 3.E 4.A 4.B 4.C 4.D 4.E 4.F 4.G	**Statement of Inquiry:** Economic activities and their impact on humankind and the environment are impacted through the adaptation of development. **Key Concepts:** Development **Related Concepts:** Adaptation **Global Context:** Globalization and sustainability: economic activities and their impact on humankind and the environment. **Approaches to Learning:** Thinking: Critical Thinking	**GOAL**: Scholars will be taught various ways engineers communicate solutions to problems and share their research. **ROLE**: Scholar is the researcher and presenter of information. **AUDIENCE**: Fellow students interested in a possible career in engineering **SITUATION**: You are a chemical engineer working with a team of environmental engineers to propose a solution to global recycling. You need to find specific products that can be recycled to create new products that can help and enhance our environment. **PRODUCT**: Scholars will investigate specialty of a chemical engineer. From this research,	• Engineering Fundamental: Design, Principles and Careers Textbook and Workbook ○ Chapters 15 & 16

	Back to Table of Contents See in Calendar		Social: Collaboration	they identify a product that could be recycled and propose a new use for this product. For example, tires are shredded and reused in playgrounds as cushion for children so they are not injured. **STANDARDS**: Criteria A-D A: Inquiring and Analyzing B: Developing Ideas C: Creating the Solution D: Evaluating the Solution	
REQUIRED			**EXAMPLES – May Be Altered According to School/Teacher Choice**		
Time Frame	**Unit Number, Title, and Key Components**	**TEKS**	**IB Connections**	**Assessment Task(s)/MYP Objective(s)**	**Resources**
10 Class Periods	**Alternative Project** **Key Components:** • Types of bridges • What makes bridges fail or successful • Design in bridges • Purpose of bridges • How bridges are built **Prioritized Skills** Reading CRS: • 301. Locate simple details at the sentence and paragraph level in uncomplicated passages. • 301. Draw simple generalizations and conclusions about people, ideas, and so on in uncomplicated passages.	1.A 1.B 1.C 1.D 1.E 2.G 3.A 3.B 3.C 3.D 3.E 6.A 6.B 6.C 6.D 6.E 9.A	**Statement of Inquiry:** The relationship and interconnectedness of individuals and civilizations leads to innovation between communities. **Key Concepts:** Communities **Related Concepts:** Innovation **Global Context:** Orientation in place and time: the relationship between and the interconnectedness of individuals and civilizations, from local and global perspectives. **Approaches to Learning:** Social: Collaboration Thinking: Creative Thinking	**GOAL**: The goal of this project is to foster teamwork and collaboration amongst a diverse group of scholars. **ROLE**: Scholars are teams of civil engineers and highly skilled experts in bridge design. **AUDIENCE**: The audience will be everyone that benefits from using the bridge. **SITUATION**: Your team of civil engineers have been hired to build the world's strongest bridge which will be used primarily to transport heavy cargo in nearby areas of East China. The Chinese government has contracted your team because you have been noted as the best in the world. As the project manager you will be required to work with various teams to help design the world's strongest bridge. **PRODUCT**: You will be required to build the strongest bridge	• Pitsco Balsa Bridge Teacher's Guide (See Concepts of Engineering and Technology supply list)

				possible using limited materials and specific design specifications. Designs will be tested for strength, aesthetics, and following the design constraints. You will present your completed project in the form of a PowerPoint **STANDARDS**: Criteria A-D A: Inquiring and Analyzing B: Developing Ideas C: Creating the Solution D: Evaluating	

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August 2018

Keep in mind:

- **MAP Testing Window: 8/20—9/21**

Sun	Mon	Tue	Wed	Thu	Fri	Sat
			1	2	3	4
5	6	7 First Day of School	8 SLA	9	10	11
12	13 What is Engineering?	14	15	16	17	18
19	20 What is Engineering?	21	22	23	24	25
26	27 What is Engineering?	28	29	30	31	

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September 2018

Keep in mind:

- **MAP Testing Window: 8/20—9/21**
- **CA 1 Testing Window: 9/24-10/3**

Sun	Mon	Tue	Wed	Thu	Fri	Sat
						1
2	3 HOLIDAY	4	5	6	7 EPAS Testing (HS)	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30						

What is Engineering?

What is Engineering?

What is Engineering?

What is Engineering?

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October 2018

Keep in mind:

- **CA 1 Testing Window: 9/24-10/3**

Sun	Mon	Tue	Wed	Thu	Fri	Sat
	1	2	3	4 END OF Q1	5 COLLAB DAY 1	6
	Research, Drawing, and Modeling					
7	8 HOLIDAY	9	10	11	12	13
		Research, Drawing, and Modeling				
14	15	16	17	18	19	20
	Research, Drawing, and Modeling					
21	22	23	24 SCHOLAR HALF DAY PARENT/TEACHER CONFERENCES	25	26	27
	Research, Drawing, and Modeling					
28	29	30	31			
	Materials, Electricity, and Civil Engineering					

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November 2018

Keep in mind:

- **Event (Date Range)**

Sun	Mon	Tue	Wed	Thu	Fri	Sat
				1	2	3
				Materials, Electricity, and Civil Engineering		
4	5	6	7	8	9	10
	Materials, Electricity, and Civil Engineering					
11	12	13	14	15	16	17
	Materials, Electricity, and Civil Engineering					
18	19 FALL BREAK	20 FALL BREAK	21 FALL BREAK	22 FALL BREAK	23 FALL BREAK	24
25	26	27	28	29	30	
	Materials, Electricity, and Civil Engineering					

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December 2018

Keep in mind:

- **EOC Retesting Window: 12/3-12/6**
- **CA 2 Testing Window: 12/10-12/19**

Sun	Mon	Tue	Wed	Thu	Fri	Sat
						1
2	3	4	5	6	7	8
	Materials, Electricity, and Civil Engineering					
9	10	11	12	13	14	15
	Materials, Electricity, and Civil Engineering					
16	17 SCHOLAR HALF DAY	18 SCHOLAR HALF DAY	19 SCHOLAR HALF DAY	20 SCHOLAR HALF DAY END OF Q2/S1	21 WINTER BREAK	22
23	24 WINTER BREAK	25 WINTER BREAK	26 WINTER BREAK	27 WINTER BREAK	28 WINTER BREAK	29
30	31 WINTER BREAK					

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January 2019

Keep in mind:

- **MAP Testing Window: 1/17-2/22**

Sun	Mon	Tue	Wed	Thu	Fri	Sat
		1 WINTER BREAK	2 WINTER BREAK	3 WINTER BREAK	4 WINTER BREAK	5
6	7 COLLAB DAY 2	8 CAMPUS PD	9 First Day of Semester 2	10 Mechanical Engineering and Robotics	11	12
13	14 Mechanical Engineering and Robotics	15	16	17	18	19
20	21 HOLIDAY	22 Mechanical Engineering and Robotics	23	24	25	26
27	28 Mechanical Engineering and Robotics	29	30	31		

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February 2019

Keep in mind:

- **MAP Testing Window: 1/17-2/22**
- **CA 3 Testing Window: 2/19-3/1**
- **TELPAS Window: 2/25-4/5**

Sun	Mon	Tue	Wed	Thu	Fri	Sat
					1	2
3	4	5	6	7 EPAS Testing (HS)	8	9
10	11	12	13	14	15	16
17	18 HOLIDAY	19	20	21	22	23
24	25	26	27	28		

Mechanical…

Mechanical Engineering and Robotics

Aerospace and Manufacturing Engineering

Aerospace and Manufacturing Engineering

Aerospace and Manufacturing Engineering

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March 2019

Keep in mind:

- **CA 3 Testing Window: 2/19-3/1**
- **TELPAS Window: 2/25-4/5**

Sun	Mon	Tue	Wed	Thu	Fri	Sat
					1 Aerospace and…	2
3	4 Aerospace and Manufacturing Engineering	5	6	7 END OF Q3	8 COLLAB DAY 3	9
10	11 SPRING BREAK	12 SPRING BREAK	13 SPRING BREAK	14 SPRING BREAK	15 SPRING BREAK	16
17	18 Chemical Engineering and the Profession of Engineering	19	20	21	22	23
24/31	25 Chemical Engineering and the Profession of Engineering	26	27 SCHOLAR HALF DAY Parent-Teacher Conferences	28	29 HOLIDAY Bad Weather Make-Up	30

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April 2019

Keep in mind:

- **TELPAS Window: 2/25-4/5**

Sun	Mon	Tue	Wed	Thu	Fri	Sat
	1	2 ACT Testing	3	4	5	6
	Chemical Engineering and the Profession of Engineering					
7	8	9 7th Writing STAAR 8th Math STAAR English I EOC	10 8th Reading STAAR	11 English II EOC	12	13
	Chemical Engineering and the Profession of Engineering					
14	15	16	17	18	19 HOLIDAY Bad Weather Make-Up	20
	Chemical Engineering and the Profession of Engineering					
21	22	23	24 ACT Make-Up	25	26	27
	Chemical Engineering and the Profession of Engineering					
28	29	30				
	Chemical Engineering and the Profession…					

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May 2019

Keep in mind:

- **Senior Finals/CA 4 Testing Window 5/13-5/15**
- **High School CA 4 Testing Window 5/20-5/23**

Sun	Mon	Tue	Wed	Thu	Fri	Sat
			1	2	3	4
			Chemical Engineering and the Profession of Engineering			
5	6 Biology EOC	7 Algebra I EOC	8 US History EOC	9	10	11
	Chemical Engineering and the Profession of Engineering					
12	13	14 7th Reading STAAR	15 8th Science STAAR	16 8th Humanities STAAR	17	18
	Chemical Engineering and the Profession of Engineering					
19	20	21 SCHOLAR HALF DAY	22 SCHOLAR HALF DAY	23 SCHOLAR HALF DAY	24 SCHOLAR HALF DAY Last Day of School	25
	Chemical Engineering and the Profession of Engineering					
26	27 HOLIDAY	28 CAMPUS PD	29	30	31	

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§130.362. Principles of Applied Engineering 2017-2018 (One Credit)

(a) General requirements. This course is recommended for students in Grades 9-10.

(b) Introduction

(1) CTE instruction provides content aligned with challenging academic standards and relevant technical knowledge and skills for students to further their education and succeed in current or emerging professions.

(2) Planning, managing and providing scientific research and professional and technical services (e.g., physical science, social science, engineering) including laboratory and testing services, and research and development services.

(3) Description. Principles of Applied Engineering provides an overview of the various fields of science, technology, engineering, and mathematics and their interrelationships. The students will develop engineering communication skills which include computer graphics, modeling and presentations by using a variety of computer hardware and software applications to complete assignments and projects. Upon completing this course, students will have an understanding of the various fields of engineering and will be able to make informed career decisions. Further, students will have worked on a design team to develop a product or system. Students will use multiple software applications to prepare and present course assignments. The original wording doesn't really help reader understand what they will actually learn.

(4) Students are encouraged to participate in extended learning experiences such as career and technical student organizations and other leadership or extracurricular organizations.

(5) Statements that contain the word "including" reference content that must be mastered, while those containing the phrase "such as" are intended as possible illustrative examples.

(c) Knowledge and skills.

(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:

(A) Demonstrate knowledge of how to dress, speak, and conduct ones' self in a manner appropriate for the profession;

(B) Show the ability to cooperate, contribute, and collaborate as a member of a group in an effort to achieve a positive collective outcome;

(C) Present written and oral communication in a clear, concise, and effective manner;

(D) Demonstrate time management skills in prioritizing tasks, following schedules, and performing goal-relevant activities in a way that produces efficient results; and

(E) Demonstrate punctuality, dependability, reliability, and responsibility in performing assigned tasks as directed.

(2) The student investigates the components of engineering and technology systems. The student is expected to:

(A) investigate and report on the history of engineering science;

(B) identify the inputs, processes, and outputs associated with technological systems;

(C) describe the difference between open and closed systems;

(D) describe how technological systems interact to achieve common goals;

(E) compare and contrast engineering, science, and technology careers; and

(F) conduct and present research on emerging and innovative technology; and

(G) demonstrate proficiency of the Engineering Design process.

(3) The student presents conclusions, research findings, and designs using a variety of media throughout the course. The student is expected to:

(A) use clear and concise written, verbal, and visual communication techniques;

(B) maintain a design and computation engineering notebook;

(C) use sketching and computer-aided drafting and design (CADD) to develop and present ideas; Clarification

(D) use industry standard visualization techniques and media; and

(E) use the engineering documentation process to maintain a paper or digital portfolio.

(4) The student uses appropriate tools and demonstrates safe work habits. The student is expected to: (A) master relevant safety tests;

(B) follow lab safety guidelines as prescribed by instructor in compliance with local, state and federal regulations;

(C) recognize the classification of hazardous materials and wastes;

(D) dispose of hazardous materials and wastes appropriately;

(E) maintain, safely handle and properly store laboratory equipment;

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(F) describe the implications of negligent or improper maintenance; and
(G) demonstrate the use of precision measuring instruments.

(5) The student describes the factors that affect the progression of technology and the potential intended and unintended consequences of technological advances. The student is expected to:
(A) describe how technology has affected individuals, societies, cultures, economies, and environments; (B) describe how the development and use of technology influenced past events;
(C) describe how and why technology progresses; and
(D) predict possible changes caused by the advances of technology.

(6) The student thinks critically and applies fundamental principles of system modeling and design to multiple design projects. The student is expected to:
(A) identify and describe the fundamental processes needed for a project, including the design process and prototype development;
(B) identify the chemical, mechanical, and physical properties of engineering materials;
(C) use problem-solving techniques to develop technological solutions;
(D) use consistent units for all measurements and computations; and
(E) assess risks and benefits of a design solution

(7) The student understands the opportunities and careers in fields related to robotics, process control and automation systems. The student is expected to:
(A) describe applications of robotics, process control and automation systems;
(B) apply design concepts to problems in robotics, process control and automation systems;
(C) identify fields and career opportunities related to robotics, process control and automation systems; and
(D) identify emerging issues trends in robotics, process control and automation systems.

(8) The student understands the opportunities and career
(A) describe the applications of electrical and mechanical systems;
(B) describe career opportunities in electrical and mechanical systems;
(C) identify emerging trends in electrical and mechanical systems; and
(D) describe and apply basic electronic theory.

(9) The student demonstrates the ability to function as a team member while completing a comprehensive project. The student is expected to:
(A) apply the design process as a team participant;
(B) assume different roles as a team member within the project;
(C) maintain an engineering notebook for the project;
(D) develop and test the model for the project; and
(E) Demonstrate communication skills by preparing and presenting the project;

(10) The student demonstrates a knowledge of drafting by completing a series of drawings that can be published by various media. The student is expected to:
(A) setup, create and modify drawings;
(B) store and retrieve geometry;
(C) understand the use of line-types in engineering drawings;
(D) draw 2D single view objects;
(E) create Multi-view working drawings using orthographic projection;
(F) dimension objects using current ANSI standards;
(G) draw single line 2D pictorial representations;
(H) create working drawings which include section views; and
(I) demonstrate a knowledge of screw thread design per ANSI standards by drawing a hex head bolt with standard, square and acme threads.