Principles of Applied Engineering
At-A-Glance - Lamar CISD

Ongoing Skills Imbedded All Year	**Professional Standards/Employability Skills/Technical Skills**		
	PAE 1(A) The student will demonstrate knowledge of how to dress, speak, and conduct oneself in a manner appropriate for the profession. PAE 1(B) The student will show the ability to cooperate, contribute, and collaborate as a member of a group in an effort to achieve a positive collective outcome. PAE 1(C) The student will present written and oral communication in a clear, concise, and effective manner. PAE 1(D) The student will demonstrate time-management skills in prioritizing tasks, following schedules, and performing goal-relevant activities in a way that produces efficient results. PAE 1(E) The student will demonstrate punctuality, dependability, reliability, and responsibility in performing assigned tasks.		
Grading Period	**Unit Name**	**Estimated Time Frame**	**TEKS**
Grading Period 1 29 Days	**Development of Engineering – What is Engineering?**	**3 Days**	2D, 2B, 2C
	PAE 2(D) The student will describe how technological systems interact to achieve common goals. PAE 2(B) The student will identify the inputs, processes, and outputs associated with technological systems. PAE 2(C) The student will describe the difference between open and closed systems.		
	Society & Ethics (Team/Cooperative Learning)	**4 Days**	1B, 1D, 1E
	PAE 1(B) The student will show the ability to cooperate, contribute, and collaborate as a member of a group in an effort to achieve a positive collective outcome. PAE 1(D) The student will demonstrate time-management skills in prioritizing tasks, following schedules, and performing goal-relevant activities in a way that produces efficient results. PAE 1(E) The student will demonstrate punctuality, dependability, reliability, and responsibility in performing assigned tasks.		
	Engineering Careers	**4 Days**	2A, 2E, 8B, 7C
	PAE 2(A) The student will investigate and report on the history of engineering science disciplines, including chemical, civil, electrical, and mechanical engineering. PAE 2(E) The student will compare engineering, science, and technology careers paths, including entry-level employment, military service, apprenticeships, community and technical colleges, and universities. PAE 8(B) The student will describe career opportunities in electrical and mechanical systems. PAE 7(C) The student will identify fields and career opportunities related to robotics, process control, and automation systems.		
	Solving Design Based Problems – Problem Solving, Design & Modeling	**3 Days**	2G, 6A, 6C, 6E, 9A, 9B
	PAE 2(G) The student will demonstrate proficiency of the engineering design process. PAE 6(A) The student will identify and describe an engineering design process needed for a project, including design process and prototype development and initiating, planning, executing, monitoring and controlling, and closing a project. PAE 6(C) The student will use problem-solving techniques to develop technological solutions such as product, process, or system. PAE 6(E) The student will assess risks and benefits of a design solution. PAE 9(A) The student will apply the design process, including decision matrices, as a team participant. PAE 9(B) The student will perform different roles within the project as a team member. PAE 9(C) The student will formulate decisions using collaborative strategies such as decision and design matrices and conflict resolution.		
	Presentation Skills & Technical Communications	**6 Days**	1A, 1C, 9F
	PAE 1(A) The student will demonstrate knowledge of how to dress, speak, and conduct oneself in a manner appropriate for the profession. PAE 1(C) The student will present written and oral communication in a clear, concise, and effective manner. PAE 9(F) The student will demonstrate communication skills by preparing and presenting the project, including building consensus setback resolution and decision matrices.		

	Inventors and Inventions Project	**9 Days**	5A, 5B, 5C, 5D
	PAE 5(A) The student will describe how technology has affected individuals, societies, cultures, economies, and environments. PAE 5(B) The student will describe how the development and use of technology influenced past events. PAE 5(C) The student will describe how and why technology progresses. PAE 5(D) The student will predict possible changes caused by the advances of technology.		
Grading Period 2 27 Days	**Design & Computation Notebook Setup**	**4 Days**	3A, 3B, 3D, 3E, 3F, 9D
	PAE 3(A) The student will use clear and concise written, verbal, and visual communication techniques. PAE 3(B) The student will maintain a design and computation engineering notebook. PAE 3(D) The student will draw conclusions using industry-standard visualization techniques and media. PAE 3(E) The student will maintain a paper or digital portfolio using the engineering documentation process. PAE 3(F) The student will use collaborative tools such as desktop or web-based applications to share and develop information. PAE 9(D) The student will maintain an engineering notebook for the project.		
	Technical Drawing Unit	**23 Days**	10A, 10B, 10C, 10D, 10E, 10F, 10G, 10H
	PAE 10(A) The student will set up, create, and modify drawings. PAE 10(B) The student will store and retrieve geometry. PAE 10(C) The student will demonstrate and use appropriate line types in engineering drawings. PAE 10(D) The student will draw two-dimensional, single view objects. PAE 10(E) The student will create multi-view working drawings using orthographic projection. PAE 10(F) The student will dimension objects using current American National Standards Institute (ANSI) standards. PAE 10(G) The student will draw single line two-dimensional pictorial representations. PAE 10(H) The student will create working drawings that include section views.		
Grading Period 3 28 Days	**Safety in the Workplace**	**10 Days**	4A, 4B, 4C, 4D, 4E, 4F, 4G, 4H, 6B
	PAE 4(A) The student will master relevant safety tests. PAE 4(B) The student will follow lab safety guidelines as prescribed by instructor in compliance with local, state, and federal regulations. PAE 4(C) The student will identify industry safety terminology related to the personal work environment such as Occupational Safety and Health Administration (OSHA), American Society of Mechanical Engineers (ASME), and personal protective equipment (PPE). PAE 4(D) The student will recognize the classification of hazardous materials and wastes. PAE 4(E) The student will describe appropriate ways to dispose of hazardous materials and wastes. PAE 4(F) The student will maintain, safely handle, and properly store laboratory equipment. PAE 4(G) The student will describe the implications of negligent or improper maintenance. PAE 4(H) The student will demonstrate the use of precision measuring instruments. PAE 6(B) The student will identify the chemical, mechanical, and physical properties of engineering materials and identify testing methods associated with the materials.		
	Team Design Based Project & Testing	**18 Days**	3A, 9D
	PAE 3(A) The student will use clear and concise written, verbal, and visual communication techniques. PAE 9(D) The student will develop and test the model for the project.		
Grading Period 4 31 Days	**Mechanical and Automation Unit & Coding Project**	**15 Days**	6A, 6D, 7A, 7B, 7D
	PAE 6(A) The student will identify and describe the fundamental processes needed for a project, including the design process and prototype development and initiating, planning, executing, monitoring and controlling, and closing a project. PAE 6(D) The student will use consistent units for all measurements and computations. PAE 7(A) The student will describe applications of robotics, process control, and automation systems. PAE 7(B) The student will apply design concepts to problems in robotics, process control, and automation systems. PAE 7(D) The student will identify emerging trends in robotics, process control, and automation systems.		
	Team Design Based Project & Testing	**16 Days**	3A, 9E
	PAE 3(A) The student will use clear and concise written, verbal, and visual communication techniques. PAE 9(E) The student will develop and test the model for the project.		

Grading Period 5 30 Days	**Engineering System: Structural Engineering Challenge**	**17 Days**	3C, 8A, 8C, 8D
	PAE 3(C) The student will develop and present ideas using sketching and computer-aided design and drafting (CADD). PAE 8(A) The student will describe the applications of electrical and mechanical systems. PAE 8(C) The student will identify emerging trends in electrical and mechanical systems. PAE 8(D) The student will describe and apply basic electronic theory.		
	Team Design Based Project & Testing	**13 Days**	3A, 9E
	PAE 3(A) The student will use clear and concise written, verbal, and visual communication techniques. PAE 9(E) The student will develop and test the model for the project.		
Grading Period 6 27 Days	**STEM Rotation 5 w/Team Design Based Project & Testing**	**17 Days**	3A, 9E, 11A, 11B, 11C, 11D, 11E, 11F, 11G, 11H, 11I
	PAE 3(A) The student will use clear and concise written, verbal, and visual communication techniques. PAE 9(E) The student will develop and test the model for the project. PAE 11(A) The student will identify and define an engineering problem. PAE 11(B) The student will formulate goals, objectives, and requirements to solve an engineering problem. PAE 11(C) The student will determine the design parameters such as materials, personnel, resources, funding, manufacturability, feasibility, and time associated with an engineering problem. PAE 11(D) The student will establish and evaluate potential constraints, including health, safety, social, environmental, ethical, political, regulatory, and legal, pertaining to a problem. PAE 11(E) The student will identify or create alternative solutions to a problem using a variety of techniques such as brainstorming, reverse engineering, and researching engineered and natural solutions. PAE 11(F) The student will test and evaluate proposed solutions using engineering methods such as creating models, prototypes, mock-ups, or simulations or performing critical design review, statistical analysis, or experiments. PAE 11(G) The student will apply structured techniques such as a decision tree, design matrix, or cost-benefit analysis to select and justify a preferred solution to a problem. PAE 11(H) The student will predict performance, failure modes, and reliability of a design solution. PAE 11(I) The student will prepare a project report that clearly documents the designs, decisions, and activities during each phase of the engineering design process.		
	Engineering Disasters	**5 Days**	2F, 6E
	PAE 2(F) The student will conduct and present research on emerging and innovative technology. PAE 6(E) The student will assess risks and benefits of a design solution.		
	Finalization of Engineering Notebook and Portfolio	**3 Days**	
	Semester Review & Exam	**2 Days**	