PACING GUIDE

COURSE: Computer Aided Engineering **GRADE(S): 10th- 12th**

MONTH	UNIT	STANDARDS/SKILLS	ASSESSMENTS What evidence (formative/summative) is utilized to establish that the content, standards, & skills have been mastered?	CONTENT Topics being covered? What do students need to know? (*nouns*)	ACTIVITIES w/Integration of Technology & Career Ready Practices
September	1A	ARCH.9-12.9.4.12.B.1 ARCH.9-12.9.4.12.B.2 ARCH.9-12.9.4.12.B.3 ARCH.9-12.9.4.12.B.4 ARCH.9-12.9.4.12.B.5 ARCH.9-12.9.4.12.B.7 ARCH.9-12.9.4.12.B.8 ARCH.9-12.9.4.12.B.9	Class Projects/ Peer grading/ Teacher The following synthesizes the important ideas and core processes that are central to the CAD discipline and will have lasting value beyond the classroom: ● Identify the types of drawings that are prepared in industry. ● Explain the various parts of a drawing that need to be checked for correctness ● Identify the various types of assembly drawings. ● Observations during in-class activities; of students' non-verbal feedback during lecture. ● Homework exercises as review for exams and class discussions. ● Reflections journals that are reviewed periodically during the semester. ● Question and answer sessions, formal—planned and informal—spontaneous. ● Conferences between the instructor and student at various points in the semester. ● In-class activities where students informally present their results. ● Student feedback collected by periodically answering specific question about the instruction and their	CAE-Unit-Plan-1A-Curriculum-ADVANCeD Working Drawings Advanced Working Drawings Working drawings tell how a design is to be manufactured and assembled and are used during the work of making a product or structure. They provide the information needed to make the parts and assemble the final product. This unit discusses production of drawings, assembly dr5awings, the outline assembly, the working drawing assembly, the general assembly and the sub assembly.	Computers, AutoCAD Software

			self-evaluation of performance and progress.		
October	1B	ARCH.9-12.9.4.12.B.1 ARCH.9-12.9.4.12.B.2 ARCH.9-12.9.4.12.B.3 ARCH.9-12.9.4.12.B.4 ARCH.9-12.9.4.12.B.5 ARCH.9-12.9.4.12.B.7 ARCH.9-12.9.4.12.B.8 ARCH.9-12.9.4.12.B.9	Class Projects/ Peer grading ○ Compare and Contrast ○ Aligned systems ○ Unidirectional Systems ○ Compare and Contrast ○ Nominal Sizes ○ Actual sizes ○ Observations during in-class activities; of students' non-verbal feedback during lecture. ○ Homework exercises as review for exams and class discussions. ○ Reflections journals that are reviewed periodically during the semester. ○ Question and answer sessions, formal—planned and informal—spontaneous. ○ Conferences between the instructor and student at various points in the semester. ○ In-class activities where students informally present their results. ○ Student feedback collected by periodically answering specific question about the instruction and their self-evaluation of performance and progress.	This unit discusses the standard practices of proper dimensioning. Dimensions on drawings give information about sizes and locations. Since production workers follow these drawings to make the products, accurate dimensioning is very important. The use of computer aided drawings and design programs makes this task much easier, allowing for rapid examination of possible design changes.	Computers, AutoCAD Software
November	1C	ARCH.9-12.9.4.12.B.1 ARCH.9-12.9.4.12.B.2 ARCH.9-12.9.4.12.B.3	The following synthesizes the important ideas and core processes that are central to the CAD discipline and will have lasting value beyond the classroom: ● The two major classifications of fasteners are temporary and permanent.	**Bolts and Fasteners** As a new product is designed and developed, determining how to fasten it together is a major consideration. Some products are designed to be disassembled easily and others are designed to be put together permanently. It is the job of the engineer/designer to specify the information	Computers, AutoCAD Software

		ARCH.9-12.9.4.12.B.4 ARCH.9-12.9.4.12.B.5 ARCH.9-12.9.4.12.B.7 ARCH.9-12.9.4.12.B.8 ARCH.9-12.9.4.12.B.9	● Many temporary fasteners incorporate threads in their design. ● Threads can be used to fasten parts together, to provide fine adjustment between parts or to transmit motion or power. ● The Unified National thread form has been the standard thread used in the United States since 1948. ● Threaded fasteners in a design are not typically drawn exact to expedite drafting time and can be represented using the simplified method. ● A "call-off" is a standardized method used by drafters to provide information about a fastener included in a design. ● Observations during in-class activities; of students' non-verbal feedback during lecture. ● Homework exercises as review for exams and class discussions. ● Reflections journals that are reviewed periodically during the semester. ● Question and answer sessions, formal—planned and informal—spontaneous. ● Conferences between the instructor and student at various points in the semester. ● In-class activities where students informally present their results. ● Student feedback collected by periodically answering specific question about the instruction and their self-evaluation of performance and progress.	necessary to describe all fasteners and their application in a particular product design	
December			The following synthesizes the important ideas and core processes that are	**CAE-Unit-Plan-2A-Curriculum- Springs**	Computers, AutoCAD Software

			central to the CAD discipline and will have lasting value beyond the classroom: ● Springs are mechanical devices used to store and apply energy. ● Springs can be used to apply a pushing, pulling or twisting force to a design. ● Helical-type springs include: Compression springs, extension springs and torsion springs. ● The free length of a spring is an important dimension used during the design process and represents the overall length of the spring when it is unloaded. ● The solid length of a compression spring is an important dimension used during the design process and represents the overall length of the spring when it is completely compressed together. ● A drawing/design that incorporates the use of a spring must include all required data and dimensions necessary to completely describe the spring being used. ● A drafter/designer must be familiar with, or be able to access information such as terminology and the formulas necessary to properly represent springs in a technical drawing.	Springs are mechanical devices that are used to store and apply mechanical energy. Springs can be designed and manufactured to apply a pushing action, pulling action or a twisting action. It is the job of the engineer/designer to specify the information necessary to describe all springs and their application in a particular product design.	
January	2A	ARCH.9-12.9.4.12.B.1 ARCH.9-12.9.4.12.B.2	● What is the main purpose of using springs in a design?	**CAE-Unit-Plan-2A-Curriculum- Springs** Springs are mechanical devices that are used to store and apply mechanical energy. Springs can be designed and manufactured	Computers, AutoCAD Software

		ARCH.9-12.9.4.12.B.3 ARCH.9-12.9.4.12.B.4 ARCH.9-12.9.4.12.B.5 ARCH.9-12.9.4.12.B.7 ARCH.9-12.9.4.12.B.8 ARCH.9-12.9.4.12.B.9	• What are the different kinds of forces a spring can either store or apply? • What are the 4 different types of helical compression springs? • Why are the free and solid length dimensions of a compression spring important to the design process? • What formulas are necessary to create drawings of compression springs? How are they implemented? • What terminology is most often used when creating technical drawings of helical springs? • What required data must be provided by the drafter/designer in order to fully describe the use of a spring in a technical drawing?	to apply a pushing action, pulling action or a twisting action. It is the job of the engineer/designer to specify the information necessary to describe all springs and their application in a particular product design.	
February	2B	ARCH.9-12.9.4.12.B.1 ARCH.9-12.9.4.12.B.2 ARCH.9-12.9.4.12.B.3 ARCH.9-12.9.4.12.B.4 ARCH.9-12.9.4.12.B.5 ARCH.9-12.9.4.12.B.7 ARCH.9-12.9.4.12.B.8 ARCH.9-12.9.4.12.B.9	• What are cams used for in a designed product? • What are the 4 types of cam motion? What drawing methods are associated with each motion? • What is the purpose of a displacement diagram? What cam attributes are used to create it? • What is happening when a cam is in a state of dwell? • Most cam displacement diagrams and layouts are drawn using what degree increment? How can the accuracy of the drawings be improved? • What terminology is used during the process of creating technical drawings of cam designs? • What information must be provided by the	**CAE-Unit-Plan-2B-Curriculum-Cams** Cams produce a simple means to obtain irregular or specified predictable motion within a designed product. It is the job of the engineer/designer to specify the information and notations necessary to describe any cams and followers used in a particular product design.	Computers, AutoCAD Software

			drafter/designer when creating technical drawings of cam designs? ● What importance does cam design play in the operation of a single-cylinder, 4-cycle internal combustion engine		
March		ARCH.9-12.9.4.12.B.1 ARCH.9-12.9.4.12.B.2 ARCH.9-12.9.4.12.B.3 ARCH.9-12.9.4.12.B.4 ARCH.9-12.9.4.12.B.5 ARCH.9-12.9.4.12.B.7 ARCH.9-12.9.4.12.B.8 ARCH.9-12.9.4.12.B.9	● What are gears primarily used for in a mechanical application? ● What is the major difference between a spur and pinion gear? ● How is gear ratio calculated? How can it be used to alter rotation and RPM? ● Why are gears often represented in simplified fashion? What 3 diameters are shown? What linetype is used ● What terminology is used when preparing technical drawings of spur gears? ● How is the cutting data chart used during the design and drawing of spur gears? ● What drawing method & terminology is used when constructing detailed views of the teeth of a spur gear? ● What importance does pitch diameter have on the meshing of two spur gears? How does pitch diameter affect center to center distance? ● What data/information must be provided on a technical drawing that incorporates the use of spur gears?	**CAE-Unit-Plan-2C-Curriculum-Gears** Gears transfer rotary motion from one shaft to another. They can change direction of rotation, speed, transmit power and change rotary motion into linear motion. It is the job of the engineer/designer to identify each kind of gear used in a particular design and prepare drawings using correct annotations and terminology.	Computers, AutoCAD Software
