PRECISION EXAMS

CAD Mechanical Design III

EXAM INFORMATION

Items
38
Points
46
Prerequisites
CAD MECHANICAL DESIGN I & II
Grade Level
10-12
Course Length
ONE SEMESTER

Career Cluster
ARCHITECTURE AND CONSTRUCTION
MANUFACTURING
SCIENCE, TECHNOLOGY, ENGINEERING AND MATHEMATICS

Performance Standards
INCLUDED

Certificate Available
YES

DESCRIPTION

The third in a sequence of courses that prepares individuals with an emphasis in developing technical knowledge and skills to develop working drawings in support of mechanical and industrial engineers, and related professionals. This includes instruction in the use of 3D Computer-Aided Design (CAD) software, threads and fasteners, welding symbols, geometric dimensioning and tolerancing, and assemblies.

EXAM BLUEPRINT

STANDARD	PERCENTAGE OF EXAM
1- Fasteners	16%
2- Welding Symbols	13%
3- Sectional & Auxiliary Views	31%
4- Flat Pattern Development	7%
5- Geometric Dimensioning & Tolerancing	26%
6- Assembly & Working Drawings	7%

STANDARD 1

STUDENTS WILL BE ABLE TO UNDERSTAND AND PROPERLY SPECIFY THE CORRECT TYPE OF FASTENERS.

Objective 1 Define thread terminology.

Objective 2 Identify strengths, weaknesses and differences between different thread forms.

1. Unified
2. Acme
3. Pipe
4. Square
5. Buttress

Objective 3 Calculate thread pitch.

Objective 4 Develop thread callout notes.

Objective 5 Draw the simplified and schematic thread forms for internal and external type threads.

Objective 6 Specify different types of cap screw and machine screws.

1. Head types
2. Hardness
3. Finish

Objective 7 Identify standard threads sizes and lengths.

Objective 8 Correctly draw, locate, and label fasteners on production, assembly drawings, and parts lists.

Standard 1 Performance Evaluation included below (Optional)

STANDARD 2

STUDENTS WILL BE ABLE TO UNDERSTAND AND IDENTIFY BASIC WELDING SYMBOLS.

Objective 1 Understand, identify, and draw basic weld symbols.

Objective 2 Understand and create detail drawings for welded part.

Objective 3 Understand and specify welds on drawings.

1. Type
2. Size and length
3. Finish and contour
4. Field welds

Standard 2 Performance Evaluation included below (Optional)

STANDARD 3

STUDENTS WILL BE ABLE TO DEVELOP AND CORRECTLY PLACE SECTIONAL VIEWS AND AUXILIARY VIEWS.

Objective 1 Be familiar with and appropriately use section views.

1. Full
2. Half
3. Offset
4. Broken-out
5. Removed
6. Revolved

Objective 2 Section lines are evenly spaced and drawn at a 45-degree angle unless a more appropriate angle is justified.

Objective 3 Cutting plane lines, section lines, and break lines are drawn according to the alphabet of lines.

Objective 4 Visible edges, hidden lines, and contours behind the cutting plane are correctly shown.

Standard 3 Performance Evaluation included below (Optional)

STANDARD 4

STUDENTS WILL BE ABLE TO DEMONSTRATE THE ABILITY TO CREATE A FLAT PATTERN DEVELOPMENT.

Objective 1 Understand bend radius.

Objective 2 Understand and calculate bend allowance.

Objective 3 Create a flat pattern development of a simple part to be made from sheet metal.

Standard 4 Performance Evaluation included below (Optional)

STANDARD 5

STUDENTS WILL BE ABLE TO UNDERSTAND AND DEMONSTRATE THE BASICS OF GEOMETRIC DIMENSIONING AND TOLERANCING (GD&T).

Objective 1 Know basic GD&T terminology.

Objective 2 Understand, identify, and draw basic GD&T symbols.

Objective 3 Specify position and geometric tolerances.

Objective 4 Draw and place feature control symbols and datum references on a drawing.

1. Specify form tolerances, e.g. straightness, flatness, roundness (circularity), cylindricity, profile of a line, and profile of surface.
2. Specify orientation tolerances, e.g. angularity, parallelism, perpendicularity, and concentricity.

3. Specify positional tolerances in reference to maximum material condition (MMC), regardless of feature size (RFS), and least material condition (LMC).

Objective 5 Specify and apply the tolerance symbols, tolerances, and datums on various drawings.

Standard 5 Performance Evaluation included below (Optional)

STANDARD 6

STUDENTS WILL CREATE ASSEMBLY AND WORKING DRAWINGS.

Objective 1 Develop a set of working drawings of six or more parts of industry assembled parts.

1. Draw all necessary views of each part.
2. Draw only one part per sheet.
3. Dimension parts as per ANSI Y14.5 standards.
4. Apply appropriate tolerances.
5. Apply necessary notes, material specifications, symbols, and other data.
6. Complete a parts list of the parts, which include, parts number, manufacturer's name, manufacturer's stock number, material specs, quantity of each part, and notes for assembly.
7. Complete an assembly drawing showing the relationship the parts to each other.
8. Include title block and border on each production drawing sheet.

Standard 6 Performance Evaluation included below (Optional)

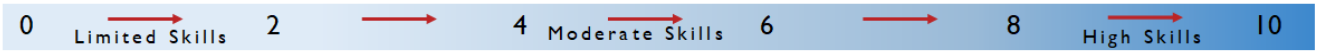
CAD Mechanical Design III Performance Standards (Optional)

Performance assessments may be completed and evaluated at any time during the course. The following performance skills are to be used in connection with the associated standards and exam. To pass the performance standard the student must attain a performance standard average of **8 or higher** on the rating scale. Students may be encouraged to repeat the objectives until they average **8 or higher**.

Students Name_____

Class_____

PERFORMANCE RATING SCALE



STANDARD 1 Fasteners — Score:

- ☐ Student understands and properly specifies the correct type of fasteners.

STANDARD 2 Welding Symbols — Score:

- ☐ Student understands and identifies basic welding symbols.

STANDARD 3 Sectional & Auxiliary Views — Score:

- ☐ Student develops and correctly places sectional views and auxiliary views.

STANDARD 4 Flat Pattern Development — Score:

- ☐ Student demonstrates the ability to create a flat pattern development.

STANDARD 5 Geometric Dimensioning — Score:

- ☐ Student understands and demonstrates the basics of Geometric Dimensioning and Tolerancing (GD&T).

STANDARD 6 Assembly & Working Drawings — Score:

- ☐ Student creates assembly and working drawings.

PERFORMANCE STANDARD AVERAGE SCORE: