University of Global Village (UGV), Barishal

Practical Skill Development and Assessment Process form (PSDAP)

Name of Subject: Engineering Drawing and CAD Sessional
Subject Code: ME 0715-2102
Student Name:
Student Id:
Credit: 1

Department: CSE
Semester: 3rd
Session:
Section:
Total Marks: 50
Obtain Marks:

SL No:	Title of Practical Skills	Details of Practical Skills	Date of Execute	Expriment wise mark Allocation		Marks Obtain (Pass mark-80%)		Status		Name of the Instructor/Lab Asst./Lab Expert	Signature of Instructor/Lab Asst./Lab Expert	Signature of External
				Cont. Assessment	Finl Assessment	Cont. Assessment	Final Assessment	C	NC			
1.	Setting up page and units	**Introduction to AutoCAD** **Description:** It replaces the T-square and compass with "Objects." In AutoCAD, you draw at 1:1 scale (actual size) in an infinite digital space called Model Space. You only decide the scale later when you are ready to print. **Key Interface Elements:** **The Ribbon:** The top toolbar containing all commands (Line, Circle, Trim, etc.). **Command Line:** The "heart" of AutoCAD. You type commands here (e.g., typing L for Line). **Crosshairs:** Your digital cursor. UCS (User Coordinate System): The X and Y icon showing your orientation. **Page Setup** **Description:** Before you draw a single line, you must define the "rules" of your digital paper. Page										

		Setup ensures your units are correct and your workspace is optimized. **Units** You must tell AutoCAD if "1 unit" equals 1 millimeter, 1 inch, or 1 meter. **What to Do:** Type UNITS and press Enter. Settings: * Type: Select "Decimal" for Metric/Mechanical or "Architectural" for Feet/Inches. **Precision:** Usually set to 0.00 or 0.000. **Limits** This defines your working area, similar to choosing a paper size (A3, A4). **What to Do:** Type LIMITS. Lower Left Corner: Usually set to 0,0.Upper Right Corner: For an A3 sheet, you would type 420,297.										
2.	**Orthographic drawing of a V-Block**	**Creates a 2D polyline, a single object that is composed of line and arc segments, circle.** **Description:** The basic drawing tools in AutoCAD are found primarily in the Draw Panel of the Home tab. Unlike manual drafting where you are limited by physical tool precision, AutoCAD tools operate on a coordinate system (X, Y), allowing for absolute accuracy. These tools are used to create the "primitive" shapes—lines, circles, and rectangles—that form the foundation of any complex engineering design. **What to Use** (Core Command Palette) **Line (L):** The most fundamental tool. It creates a series of										

		contiguous line segments, but each segment is a separate object. **Rectangle (REC):** Creates a closed polyline in a rectangular shape. You can define it by clicking two corners or by entering specific dimensions (Length and Width). **Circle (C):** Used for all radial geometry. You can draw circles by specifying a Center and Radius, or by using "Tangent-Tangent-Radius" to fit it between existing lines. **Polyline (PL):** A more advanced version of the line tool. It creates a single, connected object that can include both straight segments and arcs. **Arc (A):** Used to draw portions of a circle. The most common method is "3-Point," where you click the start, middle, and end of the curve.										
		Introduction to polygon, ellipse **Description:** In AutoCAD, Polygons and Ellipses are specialized geometric tools used to create shapes that go beyond standard rectangles and circles. They are essential for mechanical parts, such as bolt heads, and for representing circular features in 3D views. **Polygon (POLYGON / POL)** **Description:** A polygon is a closed polyline with three or more equal sides (up to 1,024). In engineering, this is most commonly used to draw hexagons for bolt heads or nuts and triangles for structural										

		symbols **Ellipse (ELLIPSE / EL)** **Description:** An ellipse is a regular oval shape. While it looks like a "squashed circle," in engineering drawing, its primary purpose is to represent circles viewed at an angle, such as in an Isometric projection.										
3.	**Advance Dimensioning and cross-sectional view of a Flanged Sleeve**	**Fills an enclosed area or selected objects with a hatch pattern, solid fill, or gradient fill** **Description:** In AutoCAD, Hatching and Gradients are used to add meaning, texture, and visual depth to enclosed areas. While Hatching usually represents physical materials, Gradients are typically used for aesthetic shading or to show lighting effects. **Hatching (HATCH / H)** Description: Hatching fills a closed boundary with a specific pattern of lines or symbols. In engineering, it is most commonly used in Section Views to show where a part has been cut and to identify the material (e.g., steel, concrete, or wood). **Gradient (GRADIENT / GD)** Description: A Gradient is a type of fill that creates a smooth transition between two colors or between a color and a tint. It is used more in architectural or presentation drawings to simulate shadows, curved surfaces, or light reflections.										

4.	**Draw a ball bearing using modify tool bar**	**To construct a geometry using basic modify Tools like Erase, Copy, Move, Rotate, Offset, Mirror** **Description:** The Modify toolbar (or panel) contains commands that allow you to move, copy, resize, and delete objects. In a professional workflow, you spend about 20% of your time drawing new lines and 80% of your time using modify tools to adjust them. These tools are the key to the speed and efficiency that CAD offers over manual drafting. **1. Erase (E)** **Description:** This tool removes objects from your drawing. It is the digital equivalent of an eraser but leaves no marks or smudges **2. Copy (CO / CP)** **Description:** Creates one or more duplicates of selected objects at a specified distance and direction. **3. Move (M)** **Description:** Repositions objects without changing their size or orientation. **4. Rotate (RO)** **Description:** Turns objects around a fixed point (the base point). **5. Offset (O)** **Description:** Creates a parallel copy of a line, polyline, or circle at a specified distance. This is the most important tool for creating wall thicknesses or concentric pipes. **6. Mirror (MI)**										

		Description: Creates a symmetrical copy of an object across a defined "mirror line." It is perfect for drawing parts that are identical on both sides.										
		Introduction to stretch, break, trim, extend, explode. **Description:** In AutoCAD, these tools allow you to manipulate the geometry of lines and shapes by lengthening, cutting, or breaking them apart. They are essential for "cleaning up" a drawing after you have placed your basic shapes. **1. Stretch (STRETCH / S)** **Description:** This tool moves a portion of an object while keeping it connected to the parts that weren't selected. It is used to change the length or shape of objects without redrawing them. **2. Break (BREAK / BR)** **Description:** This creates a gap in an object by removing a segment between two points, or simply splits one line into two at a specific point. **3. Trim (TRIM / TR)** **Description:** Acts like digital scissors. It cuts an object where it meets the edge of another object. **4. Extend (EXTEND / EX)** **Description:** The opposite of Trim; it lengthens a line or arc until it touches another object (a "boundary"). **5. Explode (EXPLODE / X)**										

		Description: Breaks a compound object (like a Rectangle, Polyline, or Block) into its individual basic components.									
		Develop geometry of planar machine parts by using Advanced Editing Commands like Fillet, Chamfer, Array **Description:** In AutoCAD, Fillet, Chamfer, and Array are considered advanced editing commands because they automate complex geometric calculations—like creating perfect tangent curves or calculating the spacing for multiple objects—that would take significant time to draw manually. **1. Fillet (FILLET / F)** **Description:** This command connects two lines or objects with a smooth, rounded arc of a specified radius. It is used to remove sharp corners and create "rounds" or "fillets" on mechanical parts. **2. Chamfer (CHAMFER / CHA)** **Description:** Instead of a curve, Chamfer cuts a sharp corner with a straight, angled line. It is common in engineering to prevent sharp edges on physical parts (beveled edges). **3. Array (ARRAY / AR)** **Description:** This is a powerful command that creates multiple copies of an object in a specific pattern (Rectangular, Path, or Polar). It is much faster than the									

		"Copy" command for repetitive layouts.									
5.	**Isometric Drawing of Z-Bracket or an Offset Pivot Bracket**	**Draw the orthographic views of 3D machine parts and organizing your work by dimensioning, managing with layers** **Description:** Creating an accurate 2D representation of a 3D machine part requires a systematic approach. You must first project the views correctly, then add quantitative data through dimensioning, and finally manage the complexity of the file using layers. **Organizing Work with Layers (LA)** Layers are the most effective way to manage professional drawing. They allow you to control the color, line type, and visibility of different elements. **Dimensioning Machine Parts (DIM)** Dimensioning tells the manufacturer exactly how large to make the part. For machine parts, precision is vital.									
6.	**3d Drawing of a cam shaft**	**Use CYLINDER for the main shaft, EXTRUDE to turn 2D cam shapes into 3D, and UNION to fuse all the parts into one solid piece.** **Description:** This is a 3D modeling task where you create a solid shaft with eccentric "cams"									

		(lobes) that rotate to move other parts. What to do: Model the main shaft as a long cylinder. Create the cam profiles as 2D shapes on the end of the shaft and "Extrude" them into 3D blocks. You then rotate these cams to different angles (like 90° or 180°) along the shaft so they trigger at different times.									
7.	**3d drawing of a worm gear**	**Use the HELIX command and the SWEEP command** **Description:** A worm gear looks like a screw with a specialized thread. It is used to transmit motion between non-intersecting shafts. **What to do:** Start by creating a 3D spiral (a Helix). Then, draw the 2D shape of a single gear tooth. You use a command to "slide" that tooth shape along the spiral path to create the threads. This is one of the more advanced 3D techniques in AutoCAD.									

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