

Universal Coupling Design Portfolio – Index

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DATE : 16-06-2025

Universal Coupling Design Portfolio

Project Overview

This project showcases the complete mechanical design and assembly of a Universal Coupling. The process involved designing all individual components in 3D using AutoCAD, drafting 2D technical sheets, applying correct tolerances, and preparing a fully detailed assembly drawing. All work was performed using ISO A3 sheet standards, first angle projection, and follows practical production tolerancing practices.

Design Workflow

1. Studied references from textbooks and standards to understand geometry, motion, and fit principles.
2. Modeled each of the 7 parts individually in 3D (Fork, Shaft, Center Block, Pin, Collar, Key, Taper Pin).
3. Created 2D sheets for each part with:
 - Properly aligned orthographic and sectional views
 - Key dimensions and functional tolerances
 - Material specifications and surface finish callouts
4. Assembled all parts into a complete 3D assembly model.
5. Drafted an assembly drawing with:
 - Front, Side, Sectional, and Isometric views
 - Part balloons and Bill of Materials
 - General and fit-based notes for production clarity.

Engineering Practices Followed

- All dimensions in millimeters (MM)
- First angle projection used throughout
- Fit systems like H7/h6 applied to shafts, pins, and holes
- Surface finish: 1.6 μm Ra on machined faces
- Materials specified: Mild Steel (EN8), Hardened Steel for taper pins, etc.
- Burr removal and tolerance conventions followed per ISO drafting standards.

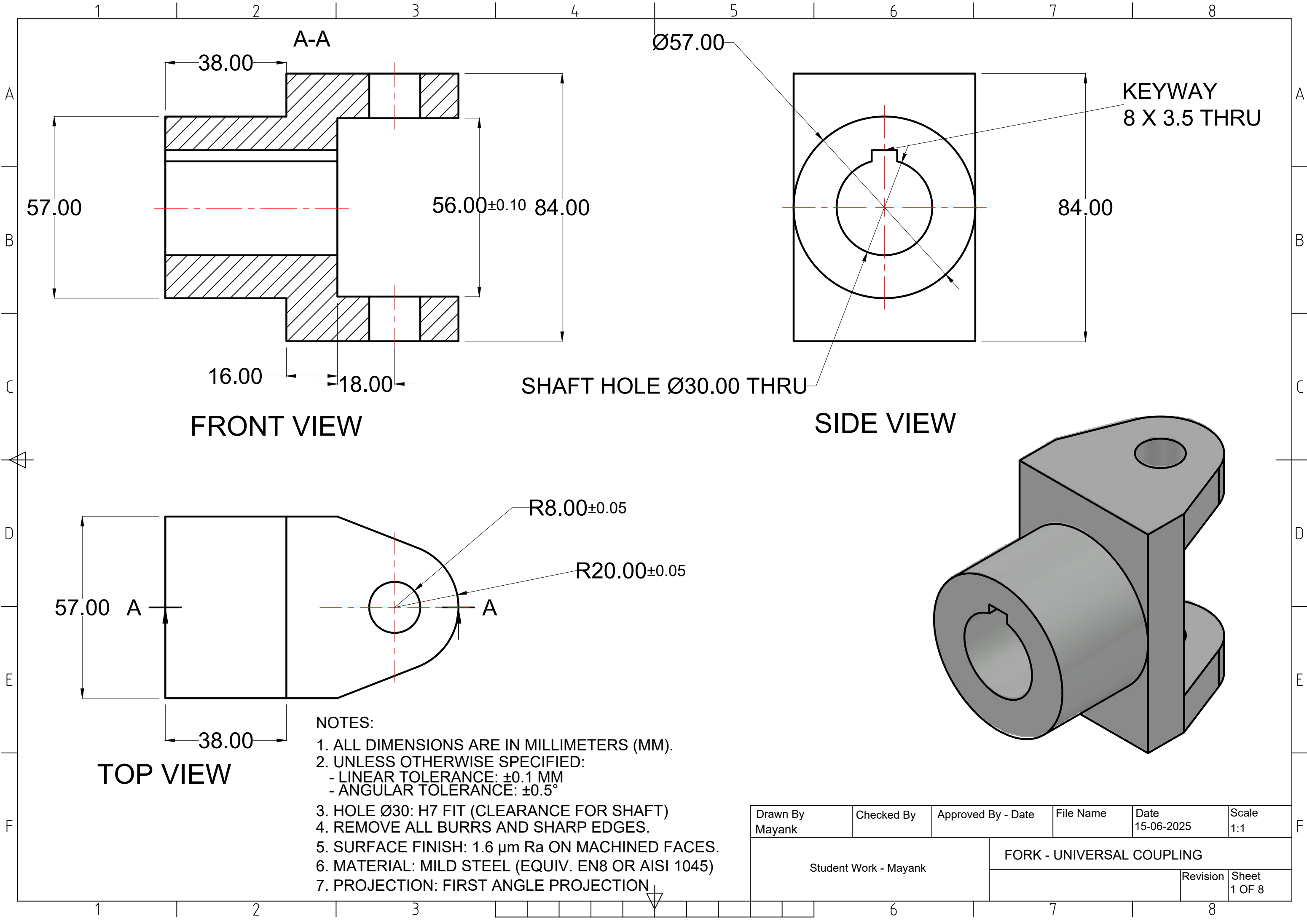
Final Outputs

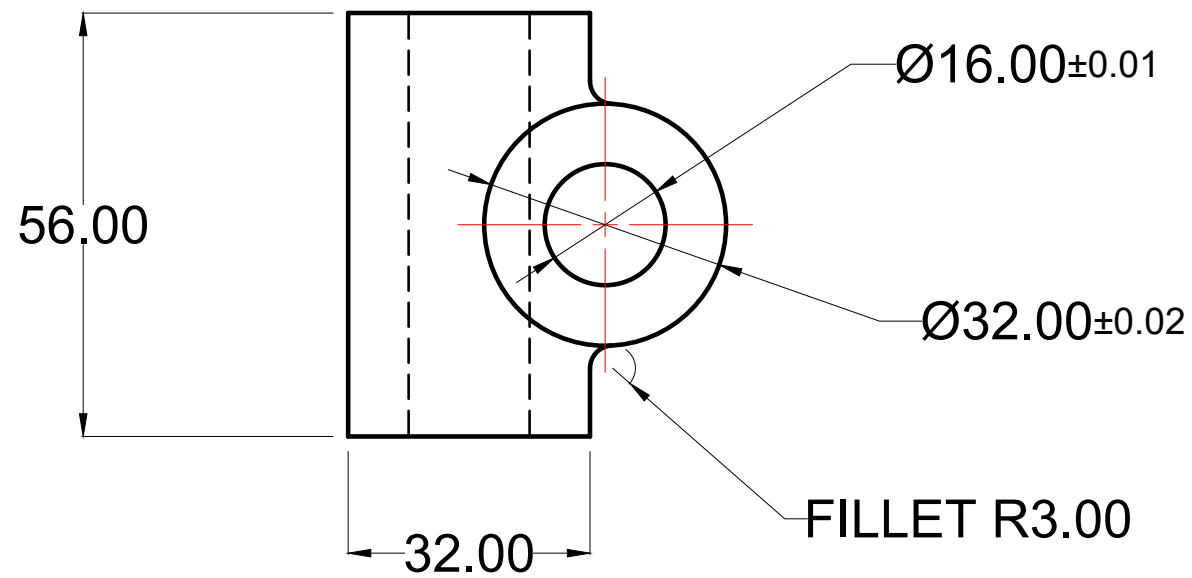
- 7 fully detailed part drawings (FORK, SHAFT, CENTER BLOCK, PIN, COLLAR, KEY, TAPER PIN)
- One assembly sheet with exploded and sectional views
- Bill of Materials with correct part counts and materials
- Ready-to-manufacture drawing set compiled in ISO A3 sheets

Universal Coupling Design Portfolio

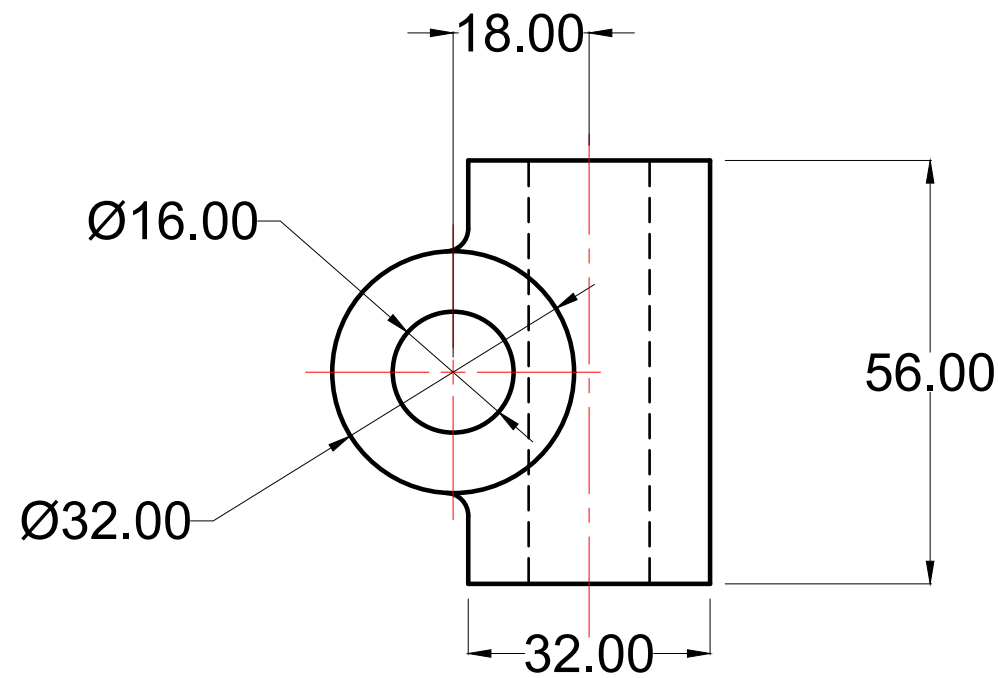
About the Designer

This project was designed and drafted by Mayank, a student in mechanical design engineering, with a focus on practical CAD modeling and production-ready documentation. The complete portfolio is hosted on GitHub for reference and showcasing design skill development.

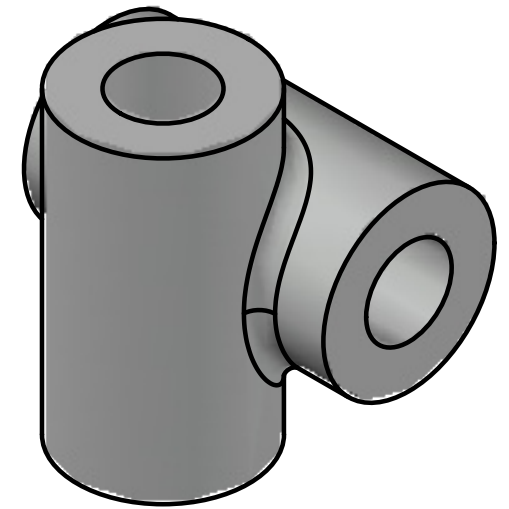




FRONT VIEW



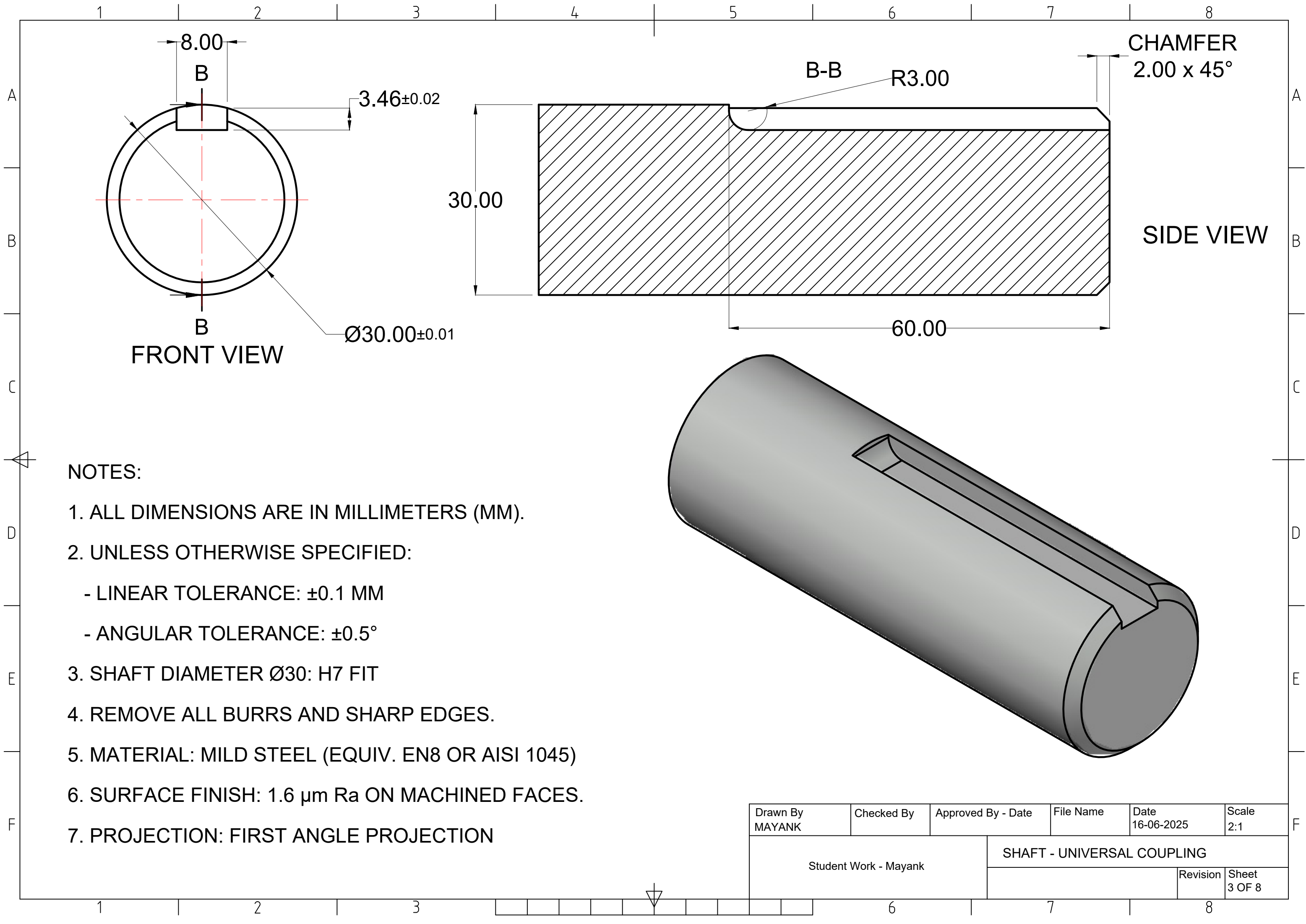
TOP VIEW



NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS (MM).
2. UNLESS OTHERWISE SPECIFIED:
 - LINEAR TOLERANCE: ± 0.1 MM
 - ANGULAR TOLERANCE: $\pm 0.5^\circ$
3. ALL HOLES ARE THROUGH (THRU) UNLESS NOTED OTHERWISE.
6. REMOVE ALL BURRS AND SHARP EDGES.
7. MATERIAL: MILD STEEL (EQUIV. EN8 OR AISI 1045)
8. SURFACE FINISH: $1.6 \mu\text{m Ra}$ ON MACHINED FACES.
9. PROJECTION: FIRST ANGLE PROJECTION

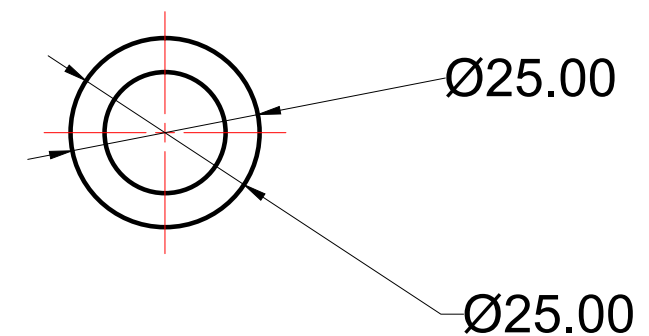
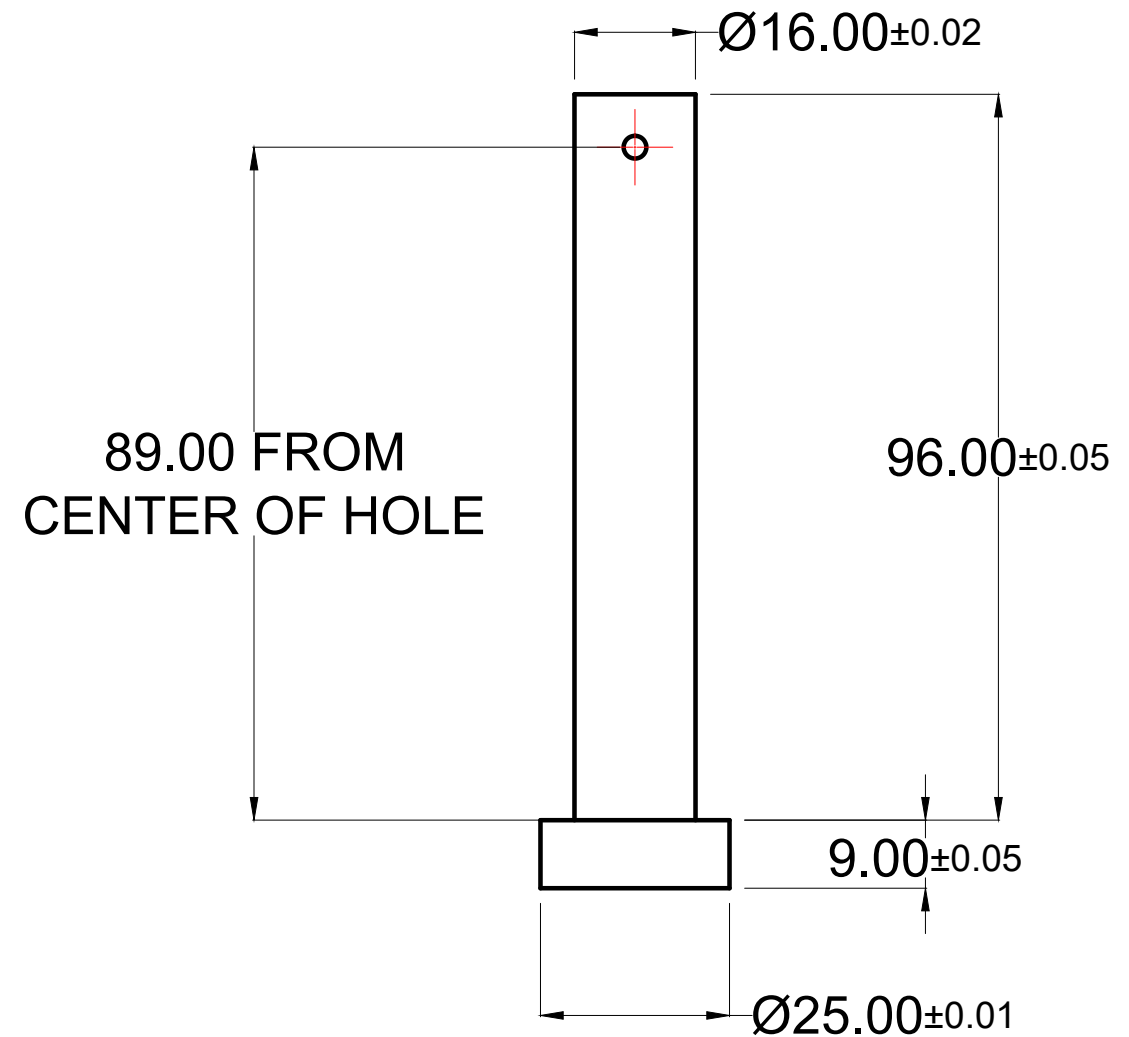
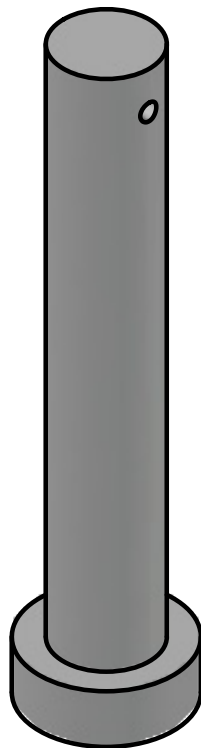
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Student Work - Mayank			CENTER BLOCK - UNIVERSAL COUPLING		
				Revision	Sheet 2 OF 8



NOTES:

- 1. ALL DIMENSIONS ARE IN MILLIMETERS (MM).
- 2. UNLESS OTHERWISE SPECIFIED:
 - LINEAR TOLERANCE: ± 0.1 MM
 - ANGULAR TOLERANCE: $\pm 0.5^\circ$
- 3. SHAFT DIAMETER $\text{Ø}30$: H7 FIT
- 4. REMOVE ALL BURRS AND SHARP EDGES.
- 5. MATERIAL: MILD STEEL (EQUIV. EN8 OR AISI 1045)
- 6. SURFACE FINISH: $1.6 \mu\text{m Ra}$ ON MACHINED FACES.
- 7. PROJECTION: FIRST ANGLE PROJECTION

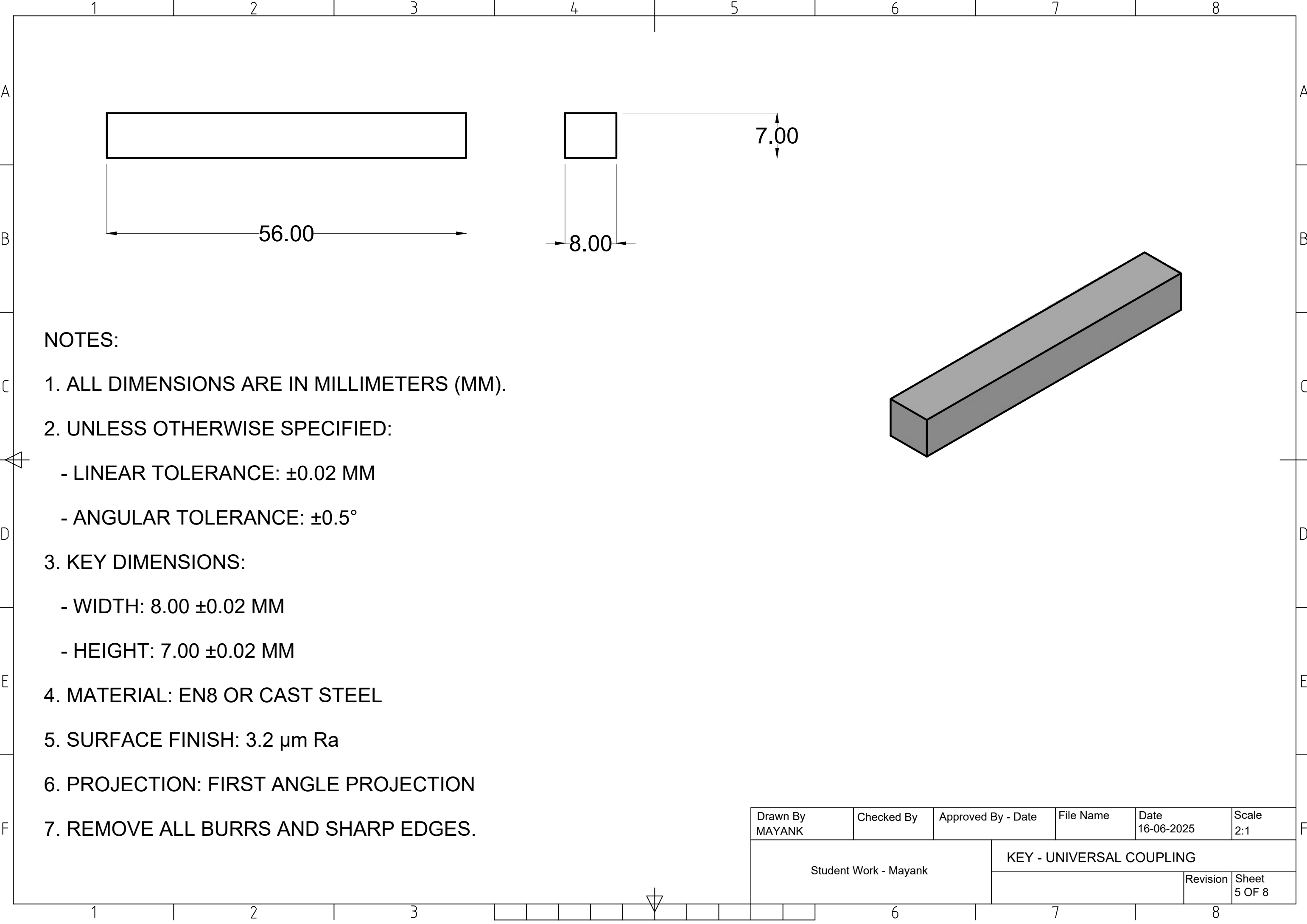
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Student Work - Mayank		SHAFT - UNIVERSAL COUPLING			
		Revision			Sheet 3 OF 8



NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS (MM).
2. UNLESS OTHERWISE SPECIFIED:
 - LINEAR TOLERANCE: ± 0.1 MM
 - ANGULAR TOLERANCE: $\pm 0.5^\circ$
3. REMOVE ALL BURRS AND SHARP EDGES.
4. MATERIAL: MILD STEEL (EN8 / AISI 1045)
5. SURFACE FINISH: $1.6 \mu\text{m Ra}$ ON MACHINED FACES.
6. PROJECTION: FIRST ANGLE PROJECTION

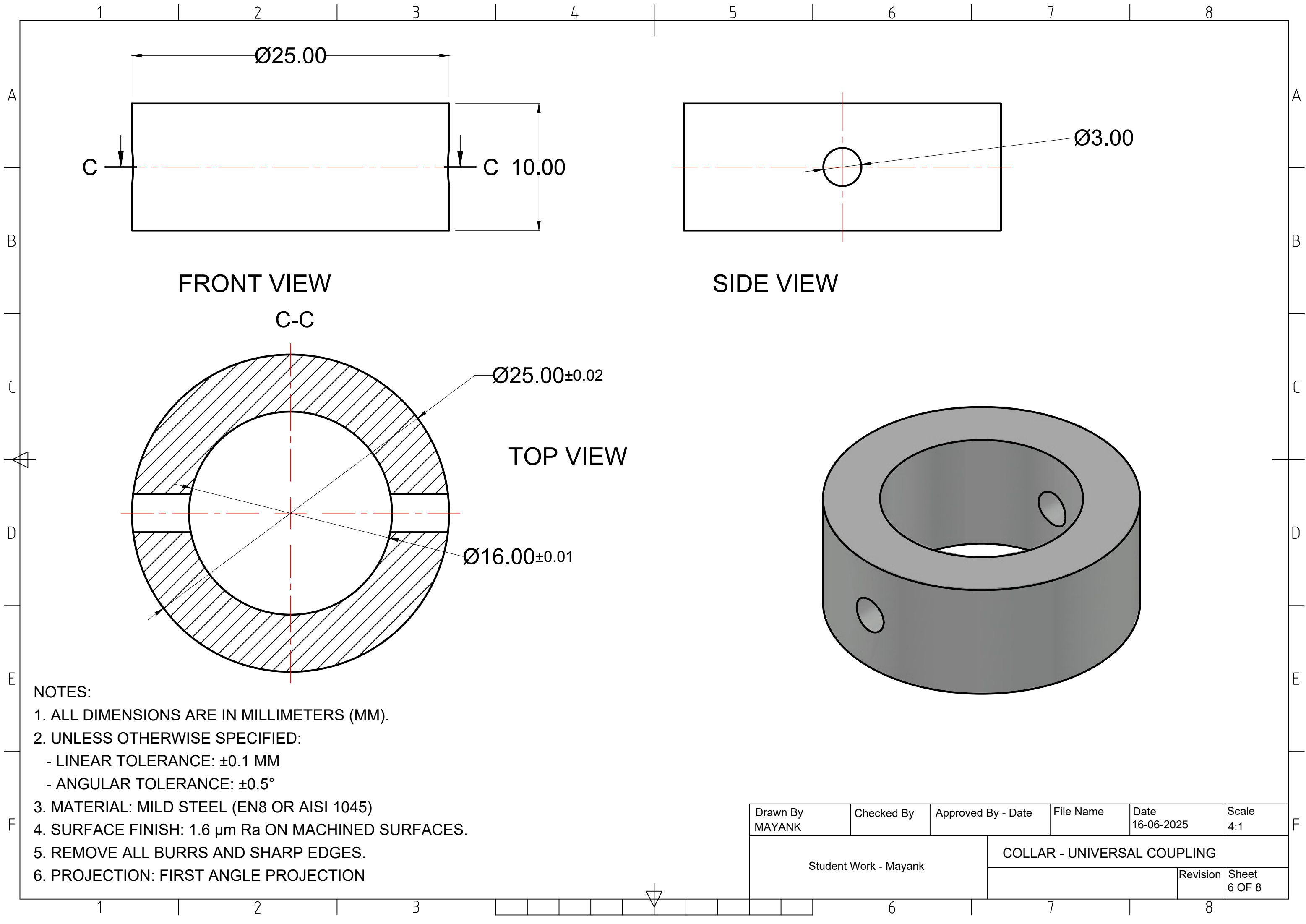
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NOTES:

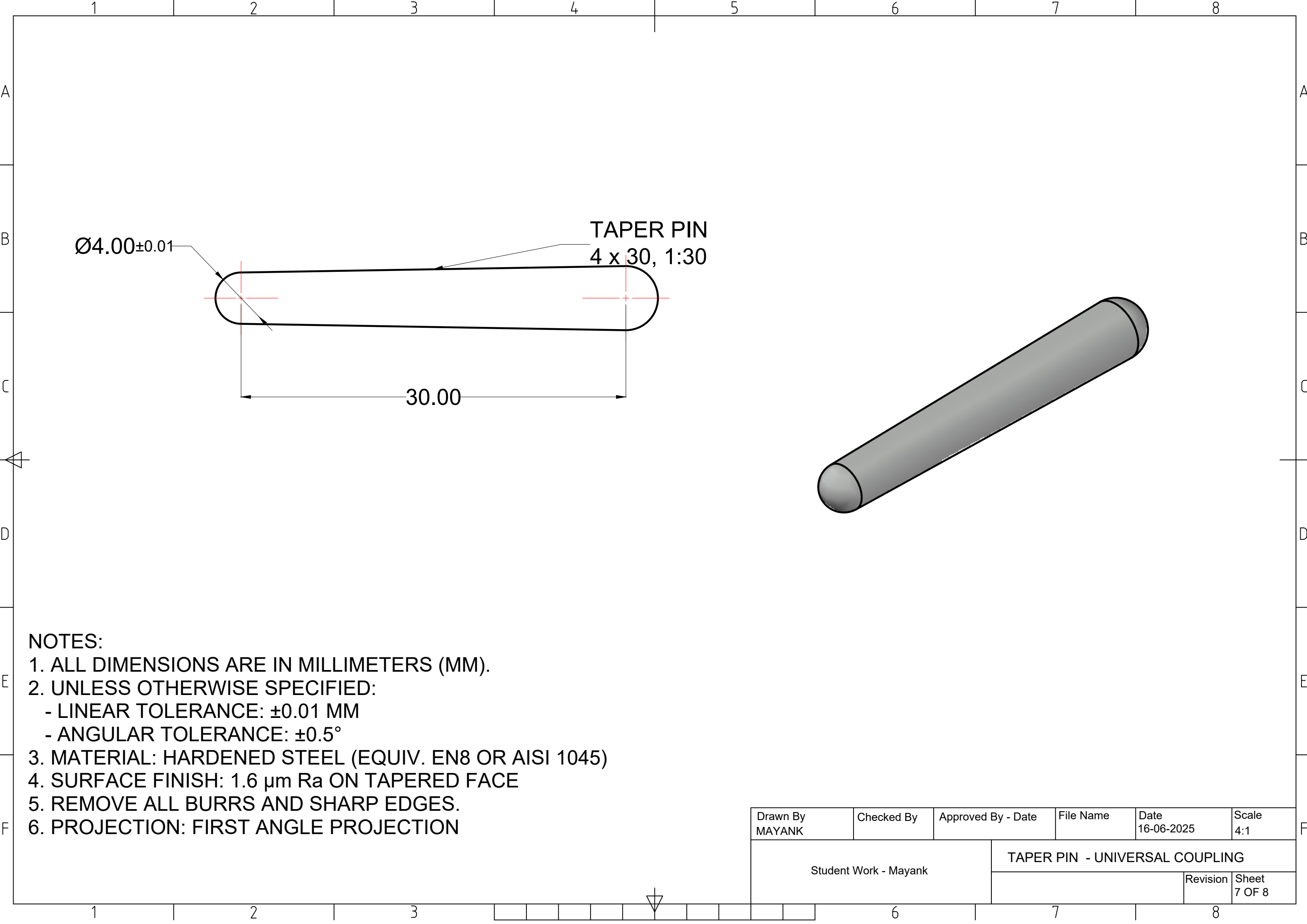
- 1. ALL DIMENSIONS ARE IN MILLIMETERS (MM).
- 2. UNLESS OTHERWISE SPECIFIED:
 - LINEAR TOLERANCE: ± 0.02 MM
 - ANGULAR TOLERANCE: $\pm 0.5^\circ$
- 3. KEY DIMENSIONS:
 - WIDTH: 8.00 ± 0.02 MM
 - HEIGHT: 7.00 ± 0.02 MM
- 4. MATERIAL: EN8 OR CAST STEEL
- 5. SURFACE FINISH: $3.2 \mu\text{m Ra}$
- 6. PROJECTION: FIRST ANGLE PROJECTION
- 7. REMOVE ALL BURRS AND SHARP EDGES.

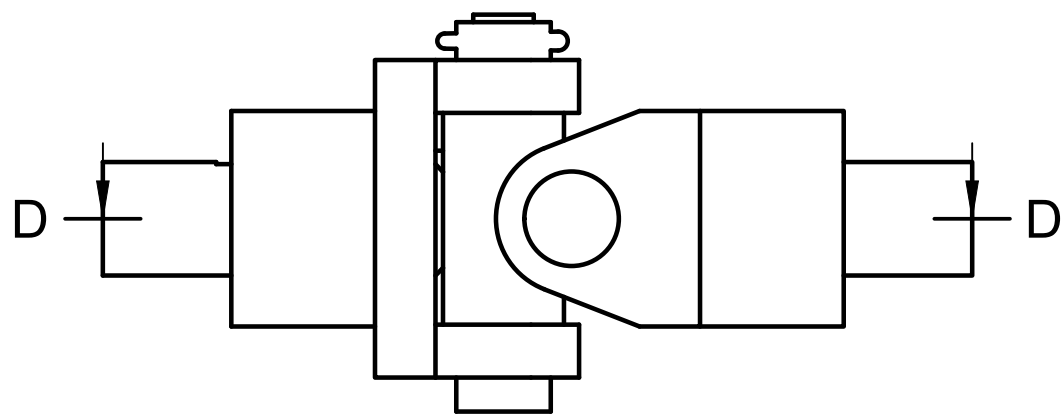
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Student Work - Mayank			KEY - UNIVERSAL COUPLING		
			Revision		Sheet 5 OF 8



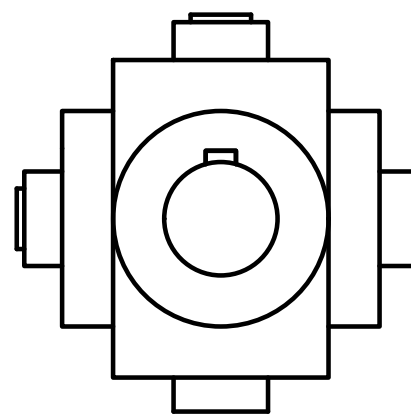
- NOTES:
- 1. ALL DIMENSIONS ARE IN MILLIMETERS (MM).
 - 2. UNLESS OTHERWISE SPECIFIED:
 - LINEAR TOLERANCE: ± 0.1 MM
 - ANGULAR TOLERANCE: $\pm 0.5^\circ$
 - 3. MATERIAL: MILD STEEL (EN8 OR AISI 1045)
 - 4. SURFACE FINISH: $1.6 \mu\text{m Ra}$ ON MACHINED SURFACES.
 - 5. REMOVE ALL BURRS AND SHARP EDGES.
 - 6. PROJECTION: FIRST ANGLE PROJECTION

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Student Work - Mayank			COLLAR - UNIVERSAL COUPLING		
			Revision		Sheet 6 OF 8

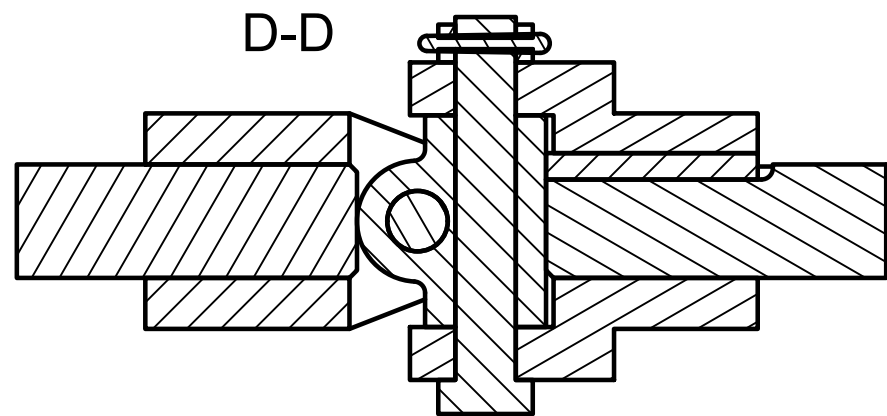




FRONT VIEW

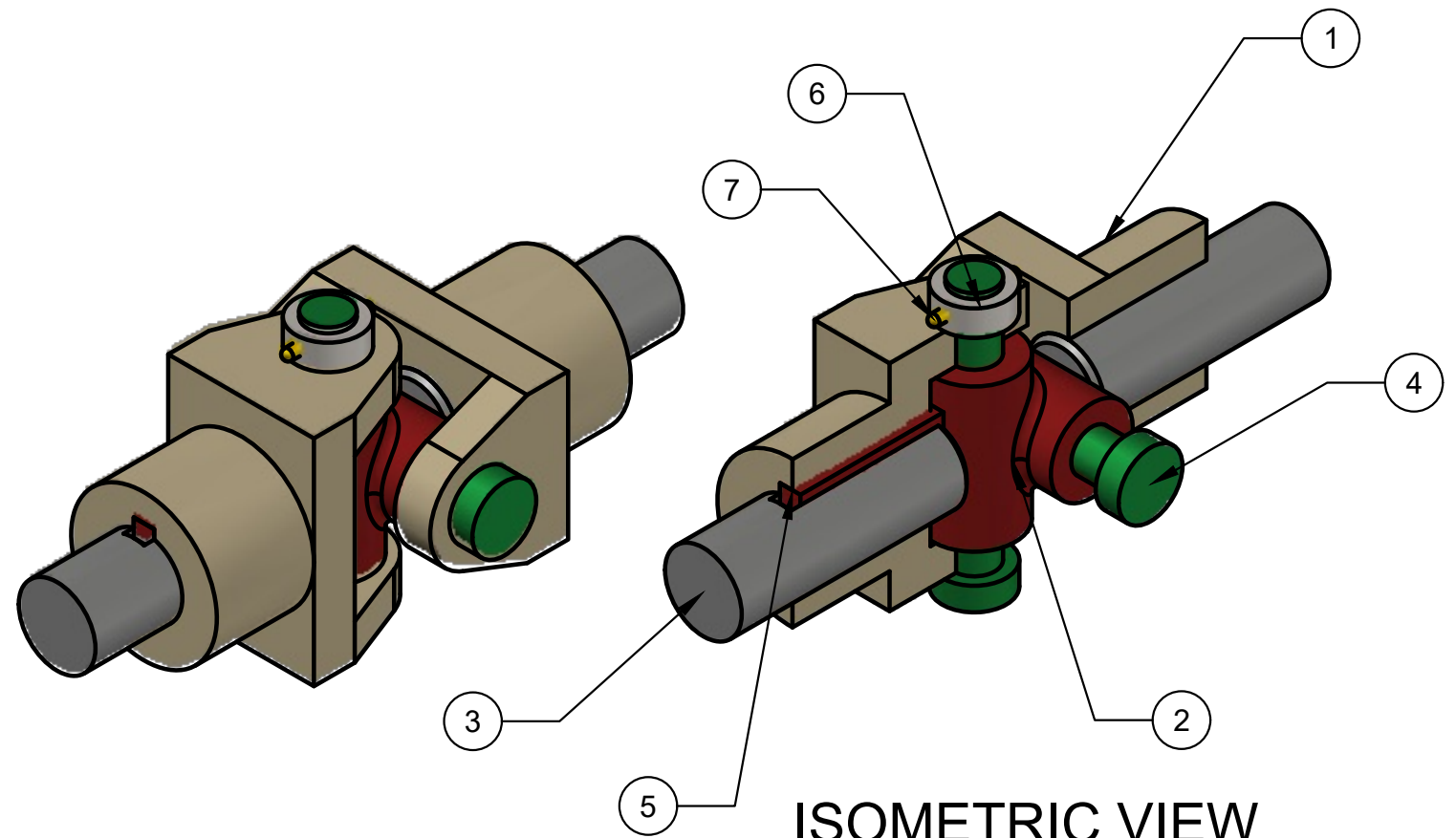


SIDE VIEW



SECTIONAL TOP VIEW

BILL OF MATERIALS			
PART NO.	PART NAME	QUANTITY	MATERIAL
1	FORK	2	MS
2	CENTRE BLOCK	1	CS
3	SHAFT	2	MS
4	PIN	2	MS
5	KEY	2	CS
6	COLLAR	2	MS
7	TAPER PIN	2	HARDENED STEEL



ISOMETRIC VIEW

NOTES:

1. ALL DIMENSIONS IN MILLIMETERS (MM).
2. ASSEMBLY TOLERANCES:
 - SHAFT $\varnothing 30$: H7 FIT INTO FORK
 - PIN $\varnothing 25$: H7 SLIDING FIT INTO CENTER BLOCK
 - KEY 8 \times 7: INTERFERENCE FIT IN SHAFT, CLEARANCE IN FORK
3. MATERIALS:
 - MS: MILD STEEL (EN8 OR EQUIV.)
 - CS: CARBON STEEL (C45 OR EQUIV.)
 - HARDENED STEEL: FOR TAPER PIN (EN31 OR EQUIV.)
4. SURFACE FINISH: 1.6 μ m Ra ON MATING SURFACES.
5. PROJECTION METHOD: FIRST ANGLE PROJECTION.

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				Revision	Sheet 8 OF 8