

# INDIAN INSTITUTE OF TECHNOLOGY HYDERABAD

Department of Mechanical & Aerospace Engineering

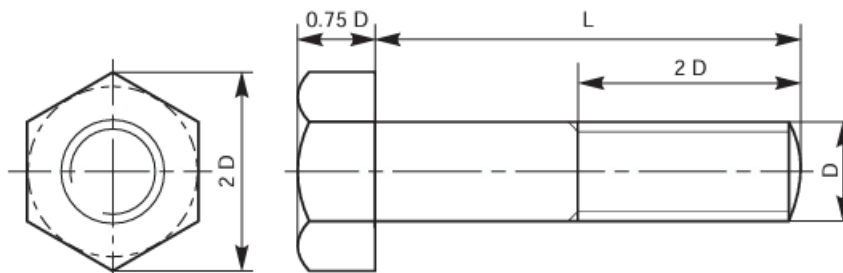
ME3413: Machine Drawing & Solid Modelling

## Tutorial - 04: Threads and Assembly

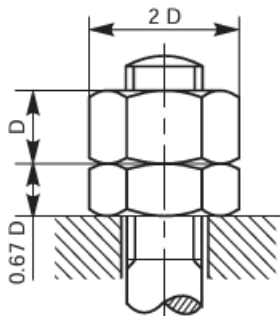
Time: 3 hrs

### Task 1:

Create a 3D model of a partially threaded hexagonal bolt with the specifications **M20 × 3.0 × 120 mm**, use the figure below for the rest of the dimensions



Create a lock nut for the same threaded bolt above using the dimensions below



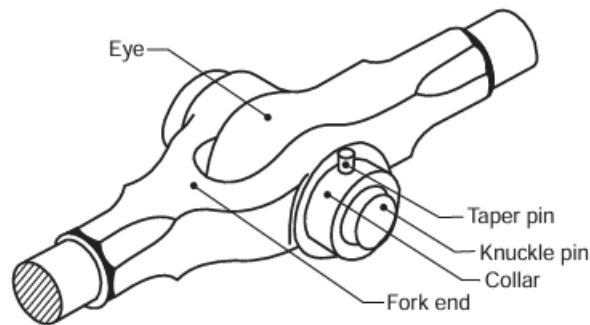
In your submission, include a drawing file that presents the **isometric view, front sectional view, and top view** of the bolt and nut arrangement.

### Task 2:

#### Introduction:

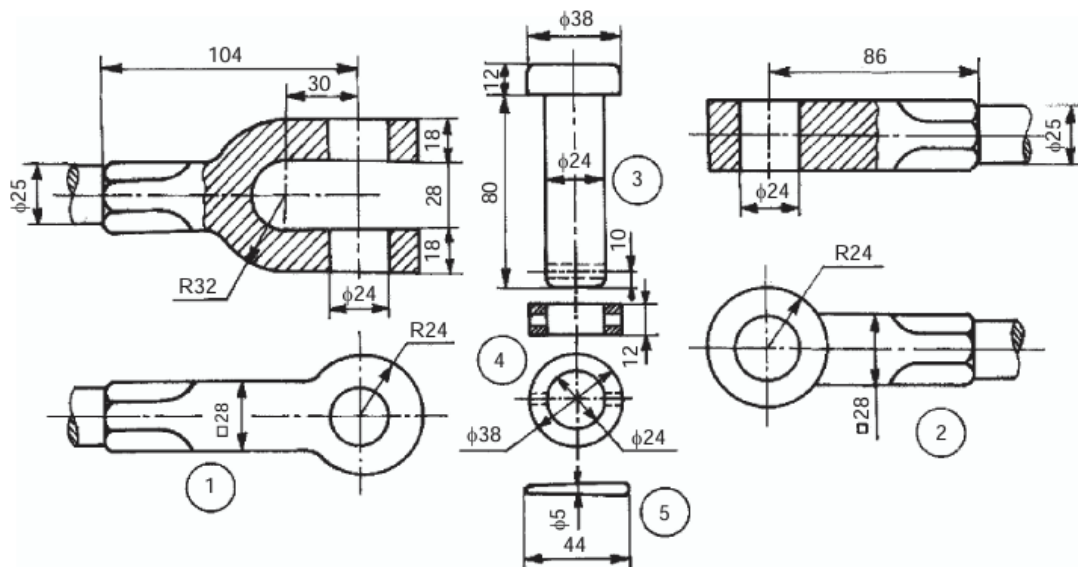
**Knuckle joint** is a pin joint used to fasten two circular rods. In this joint, one end of the rod is formed into an eye and the other into a fork (double eye). For making the joint, the eye end of the rod is aligned into the fork end of the other and then the pin is inserted through the holes and held in position by means of a collar and a taper

pin as shown in the figure below. Once the joint is made, the rods are free to swivel about the cylindrical pin. Knuckle joints are used in suspension links, air brake arrangement of locomotives, etc.



**Task:**

The figure below presents the individual components of a knuckle joint, along with their front sectional and top views, including respective dimensions. **Assemble the given parts and create the knuckle joint's front, top, and right-side views and create a part list in your assembly drawing.**



Parts list

Sl. No.	Name	Matl.	Qty.
1	Fork end	Forged steel	1
2	Eye end	Forged steel	1
3	Pin	Mild steel	1
4	Collar	Mild steel	1
5	Taper pin	Mild steel	1

Reference:

**Machine Drawing.** KL. Narayana, P. Kanniah and K. Venkata Reddy