Cylinders and quadric surfaces
Quadric surfaces are the graphs of any equation that can be put into the general form:

\[ Ax^2 + By^2 + Cz^2 + Dxy + Exz + Fyz + Gx + Hy + Iz + J = 0 \]  

(1)

where \( A - J \) are constants.

Cylinders: A cylinder is a surface that is generated by moving a straight line along a given planar curve while holding the line parallel to a given fixed line.

Ex: Find an equation for the cylinder made by the line parallel to \( z \)-axis that pass through the parabola \( y = x^2, z = 0 \).

\[ y = x^2 \]  

(2)
• Ellipsoid $\frac{x^2}{a^2} + \frac{y^2}{b^2} + \frac{z^2}{c^2} = 1$

• Elliptical cone $\frac{x^2}{a^2} + \frac{y^2}{b^2} = \frac{z^2}{c^2}$

• Hyperboloid of one sheet $\frac{x^2}{a^2} + \frac{y^2}{b^2} - \frac{z^2}{c^2} = 1$