CHEN.3170 Applied Engineering Problem Solving

A Short Quiz on
Working with Taylor Series

Using the definition of the Taylor series as given below, develop an expansion for $f(x) = \cos(ax)$ about the point $x_o = 0$ that includes the first four (4) terms of the expansion (i.e. up to and including the term containing the 3rd derivative), where

$$f\left(x_o + (x - x_o)\right) \; = \; f(x) \; = \; \frac{f(x_o)}{0!} + \frac{f'(x_o)}{1!}\left(x - x_o\right) + \frac{f''(x_o)}{2!}\left(x - x_o\right)^2 + \;\; \cdots$$

Also identify the "order of error" associated the final Taylor series approximation.