54. A rod has a length of $l \sim N(80, 0.1^2)$ mm and a diameter of $d \sim N(10, 0.1^2)$ mm. It is subjected to a tensile force $F \sim N(32, 3^2)$ kN. The poission ratio is $\nu = 0.29$ and the modulus of elasticity is $E = 80$ GPa. If the allowable change in rod diameter is $\Delta d_a = 0.02$ mm, estimate the probability of failure using the First Order Second Moment Method.

Answer: $p_f = 8.63(10^{-5})$