**BSEN 6250**

**Homework 1 – Analytical Models**

1. Write an Excel spreadsheet to solve Exercise 1-8 in the text using the specified conditions. Add a 2nd column to re-compute fish length assuming the growth constant (k) is 0.05. Describe in a short paragraph (Word document) how changes in the growth constant effects fish growth.

2. Write an Excel spreadsheet to solve Exercise 1-9 in the text. Add a 2nd column to re-compute population density assuming the initial population is 1 organism per unit area. Describe in a short paragraph (Word document) how the initial population impacts the growth in population over time.

Upload your spreadsheet and word document to Canvas.

**Solution:**

**Problem-1: Impact of Growth Constant on Fish Growth:**

The growth constant (k) in the Von Bertalanffy model affects how quickly a fish grows to its maximum size. When k is set to 0.23, the fish grows quickly and gets close to its full size of 51.6 mm within 12 months, reaching about 48.85 mm. On the other hand, if k is only 0.05, the fish grows more slowly and only reaches 27.78 mm in the same time. So, a higher growth constant means faster growth, while a lower constant means slower growth.

**Problem-2: Impact of Initial Population on Growth Over Time:**

The starting number of organisms affects how quickly a population grows. If it starts with 5 organisms per unit area, the population grows faster and reaches the maximum limit (800 organisms) sooner. If it starts with only 1 organism per unit area, the population still reaches the same limit eventually but takes more time. So, starting with more organisms leads to faster growth, while starting with fewer takes longer to reach the same maximum.