Course Learning Objectives - CBE 475

Applied Microbiology and Bioengineering (3)

At the conclusion of this course, the student should be able to:

1. Describe the components, structure, and growth requirements of living cells.
2. Derive an ODE-based model for predicting the rate of enzyme catalyzed reactions (e.g., Michaelis-Menten).
3. Given appropriate parameters, predict the rate of enzyme-catalyzed reactions from mathematical models (Michaelis-Menten).
4. Determine enzyme kinetic parameters (Km and Vm) from experimental data.
5. Describe general molecular mechanisms of gene and metabolic regulation.
6. Model cellular growth in batch culture (e.g., Monod model).
7. Model cellular growth and productivity in continuous culture (chemostat).
8. Model cellular growth and productivity in fed-batch cultures.
9. Describe several types of bioreactors for growing cells.
10. Scale a stirred-tank bioreactor up or down holding constant appropriate parameters relevant to a given type of cell culture.
11. Calculate process parameters (e.g., position of species bands in a chromatography column) for purifying biotechnology.