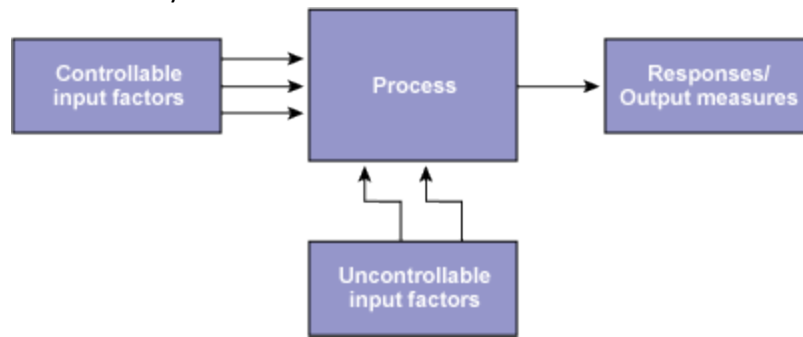


Design of Experiments Feasibility:



Benchtop Experiment-

- Definition of Success: 40 Days of continuous growth
- Type of Experiment: 2-Level Factorial Design
 - 32 Test Cases tested through 16 test setups
- Testing 3 plants: Lettuce, Chinese Cabbage, Radish
- Factors (controllable input factors):
 1. Light (Watts)- Low End 3W vs High 4.5W
 2. Water Dripped- Tap vs Distilled
 3. Fertilizer Synthetic- x1 Concentration vs x2 Concentration
 4. Water Rate- Low Flow Rate vs High Flow Rate
 - a. numerical rates unknown until system is implemented and experimental data collected
 5. Light Exposure Time- 12hrs vs 16hrs
- Uncontrollable input factors:
 1. Germination
 2. Tray
 3. Rotation
 4. Temperature- based on room temp
 5. Humidity- no fan
 6. Building Hours and Academic Calendar w/ resource refill
 7. Building Hours and Academic Calendar w/ data collection
- Analysis Procedure for a 2^{K-1} Design
 1. Estimate factor effects
 2. Form initial model
 - Design is replicated, fit full model
 3. Perform statistical testing
 4. Refine model- nonsignificant factors can be considered part of the error
 5. Analyze residuals
 6. Interpret the results

System Experiment-

- Definition of Success: 40 days of continuous growth
- Factors: Tray Design, Water Delivery System, Lights, Rotation Speed
- Uncontrollable input factors:

1. Location Environment/Atmosphere
 2. Building Hours and Academic Calendar w/ resource refill
 3. Building Hours and Academic Calendar w/ data collection
 4. Temperature- based on room temp
- Analysis same as test bench