

# CE 631: Simulation and IT Applications in Construction Semester 1 - 2024

Test  
Time: 1 Week

## **Question # 1: Take Home**

Date: November 18, 2024 at 11:30 am

(3 pages including cover sheet)

**Include this questions booklet to your answer booklet and submit  
them online on or before Monday, November 25, 2024, at 8:30am**

Name: \_\_\_\_\_

ID #: \_\_\_\_\_

**Problem No. 1:**      **(Assume any missing information)**      Name: \_\_\_\_\_

Conduct a simulation of the precast concrete element plant modeled as attached. Assume that each batch results in the production of 2 concrete elements. Assume that the use of each form costs \$1,000/day. Assume that the daily (8-hour shift) cost of each additional crew is \$800. In the range of 2 to 5 crews and for 2, 4, 6, and 8 forms, using sensitivity analysis, determine which system will produce the optimum cost/element (i.e., minimum cost/unit). Data are given in the following tables.

**Table 1: System Time Attributes**

Element Number	Distribution	Set Number	Mean	Lower Bound	Upper Bound	Standard Deviation
2	Normal	2	40	30	60	8
4	Constant	3	150	-	-	-
6	Constant	4	30	-	-	-
8	Normal	5	35	18	52	7
10	Constant	6	400	-	-	-
12	Normal	5	25	14	42	5
14	Normal	7	45	20	64	8.5
19	Normal	8	65	37	83	20
21	Normal	9	38	19	57	8

**Table 2: Ingredient-Constrained Work Tasks**

Ingredient	Activities				
	2 Mix and pour	6 Pull Forms	8 Load in Curing Tunnel	12 Unload form Tunnel	19 Clean Form
1	Crew at 15	Batch and form at 5	Batch at 7	Batch at 11	Crew at 15
2	Batch at 22	Crew at 15	Cure position at 18	Truck at 17	Form at 16
3	Set position at 23		Crane at 25	Crane at 25	
4	Form at 24				

**Questions:**

- Develop EzStrobe and AnyLogic models to simulate the attached precast concrete model.
- Run the models to determine the average precast concrete element's production.
- Generate complete sets of reports from both programs.
- Select the best alternative.

