

Department of Industrial Engineering University of Stellenbosch

Simulasie 442 : Simulation 442 2025

Tutoriaal 11 <i>Tutorial 11</i>	Punt: 66 <i>Mark:</i>	Ingeedatum: 17-10-2025 (10:00) B3003 <i>Due date:</i>
Instruksies:	Formateer alle syfers sinvol. Ontwikkel die modelle individueel. U mag in groepe van twee of minder werk om die vrae te beantwoord. Handig slegs een dokument in. Gebruik Tecnomatix en Excel vir u berekenings. Hierdie tutoriaal en prakties is verpligtend. Indien u nalaat om die vereistes betyds na te kom, sal u die module sak.	
<i>Instructions:</i>	<i>Format all numbers sensibly.</i> <i>Develop the models individually.</i> <i>You may work in groups of two or less when answering the questions.</i> <i>Submit one document only.</i> <i>Use Tecnomatix and Excel for your calculations.</i> <i>This tutorial and practical are compulsory.</i> <i>You will fail the module if you do not comply with the requirements, on time.</i>	

Build the trauma unit model in Tecnomatix – the instructions are available on STEMLearn. Answer the following questions:

Question 1 [19]

Complete the table below to show your understanding of the model.

	Trauma Unit Model	
The essence of the problem		[2]
Objective of the simulation		[1]
Input variables		[3]
Decision variables		[2]
Output parameters		[1]
Assumptions made		[2]
Validation considerations		[2]
/////		
Entity		[1]
Attributes		[1]
Resources		[1]
Conditions		[1]
Events		[1]
System State variables		[1]

Question 2 [17]

1. Describe this model based on Figure 1.3 in the Simulation e-book in terms of time dependency, variable types and time increments. [3]
2. Define simulation by using this model as an example. [4]
3. Explain to your cousin in grade 8 why this model can be considered a production line, and what the bottleneck is. [4]
4. Refer to Section 6.6 in the eBook, and to (6.8). Explain what \mathbf{x} and Ω in this problem are. [6]

Question 3 [30]

1. Determine the best number of doctors and nursing staff needed over the 24h period, as well as the need or not for the fourth consulting room (CR4). Should CR4 support CR1 or CR2? Explain and motivate your answer. [30]
2. Critically interpret the number of staff members calculated in the previous question with reference to real world labor laws. [4]

Total: Cross-check: 66