**EEX5362 – Performance Modelling**

**Mini Project**

**(Deliverable 01)**

**Name : E.M.V.T Bandara**

**Reg No : 221436008**

**Performance Modeling and Evaluation of an Outpatient Healthcare Process.**

**1. General Problem Statement.**

The system being studied is a minor outpatient health process wherein patients are taken through a series of work processes

**(Arrival -> Registration -> Waiting -> Consultation -> Medication Dispensing)**.

Although its size is small, there is a delay in the system because of the limited resources, a sequence of service stages, and variability in patient arrivals. Such delays may lead to longer waiting lines of patients, low throughput and uneven use of resources for the staff.

This system is complex enough to simulate important facets of performance that include waiting time at various points, throughput (patients served/hour) of the system, staff utilization, and the identification of a bottleneck. The objective is to assess existing performance and suggest ways to make it better to streamline the flow of patients and optimize resource allocation.

**2. System Overview**

**2.1 System Components**

* **Patient Registration Unit**- Records patient details and allocates a queue to them.
* **Waiting Area**- This is the facility where a patient waits before they are consulted.
* **Consultation Unit**- The medical staff examine the patients and prescribe medication.
* **Medication Dispensing Unit**- Dispenses prescribed medicines after consultation.

**2.2 Key Measurable Parameters**

**Patient Arrival Rate**

* The number of patients coming in per hour, on average.
* Example-(5–10 Patient)

**Consultation Time**

* Time spent with the patients.
* Example-(10–12 minutes)

**Medication Dispensing Time**

* Minutes to dispense medication.
* Example-(4–6 minutes)

**Waiting Time (Peak)**

* Mean pre-consultation waiting time.
* Example-(15–20 minutes)

**Total Patients per Day**

* Total patients processed.
* Example-(30–50)

**2.3 Example Data Set**

****

**Notes**

* Assume only one doctor is on duty.
* Wait\_consult = (Consult\_start – Arrival\_time)
* Wait\_dispense = (Dispensing\_start – Consult\_end)

**3. Performance Objectives**

**Reduce Waiting time of the patients.**

* Minimize waiting (pre-consultation/pre-dispensing).
* Minutes per patient **(Metric).**

**Maximize Staff Utilization**

* Ensure optimal staff engagement.
* Percentage utilization **(Metric).**

**Maximize Throughput**

* Enhance the number of patients being handled in each period.
* Patients per hour **(Metric).**

**Identify Bottlenecks**

* Identify phases where there are delays (consultation, dispensing)
* Waiting time, Average queue length **(Metric)**.

**Maximize Allocation of Resources.**

* Optimize resource allocation and workflow.
* Decrease in waiting time and increased throughput **(Metric).**