**Course Work Answer Book**

**UNIVERSITY COURSE WORK**

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| REGISTRATION NUMBER | | | | | | | | | VU-BIT-2301-1359-DAY | | | | | | |
| Title of The Program (eg BBA, BSC, BPH, BSWA) | | | | | | | | | | | | | BIT | | |
| Bachelor of Information Technology | | | | | | | | | | | | | | | |
| Department | | | | Other Depts in Faculty of Science and Technology | | | | | | | | | | | |
| Faculty | Faculty of Science and Technology | | | | | | | | | | | | | | |
| Year Of study (YrI , YrII, YrIII, or YrIV) | | | | | | | | | | | 2 | | | | |
| Module Code and Name | | | | | | | 3109 FST | | | | | | | | |
| Simulation and Modelling | | | | | | | | | | | | | | | |
| Semester | | | 2 | | | | | | | | | | | | |
|  | | | | | | | | | | | | | | | |
| Retake: | | Yes | | | ☐ | | | No | | ☐ | | (Tick whichever is applicable) | | | |
| Date of Course Work | | | | | | Sun Sep 01 2024 16:08:33 GMT+0300 (East Africa Time) | | | | | | | | | |
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| ***DIRECTIONS TO CANDIDATES (Turn to page ii for more instructions).*** | | | | | | | | | | | | | **FOR USE BY EXAMINERS ONLY** | | |
| **Question Number** | **Internal Examiner** | **External Examiner** |
| 1. Leave margin blank. 2. Begin each answer on a fresh page. 3. Write the number of each question and theCandidate's Number at the top of each page. 4. Write the numbers of the questionswhich you have attempted, with subsections where necessary, in the spacesprovided below | | | | | | | | | | | | |
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| **NUMBER OF QUESTIONS** you have answered in the order in which you have written them | | | | | | | | |
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**How and where should I submit my Course Work script?**

Every student will be required to submit their Course Work via [VClass Students Portal](https://vclass.ac/) E.g. you go to [www.vclass.ac](http://www.vclass.ac) and login, to your account, then on the left sidebar menu **click on Course Work**.

Under Course Work you will see the following: -

1. Instructions for that particular Course Work with time required to finish your Course Work as per instructions,
2. A student will be required to download the question paper and the answer sheet provided by the university within the same module Course Work, or a student can be required to attempt structured questions within the system depending on how the Course Work was set.
3. Submission of answered questions is done,
4. Student is required to click to **consent** to show that the answered Course Work belongs to them.
5. **Note** that if Course Work is for download, a student will be required to download the question paper and answer sheet, do their Course Work within the given stipulated time.
6. Required to scan and upload back the answered booklet through the same portal as per format available.
7. Course Work uploaded will directly be received by the Registry department.
8. Students here are required to use [VClass e-Learning system](https://vclass.ac)for all Course Work and for any failure they can contact the Registry department for guidance.
9. No late submission will be accepted.

**Avoid any malpractice because this will attract severe penalties such as invalidating the answered script whose consequences will attract retakes.**

* The table summarizes the simulation of a queue system with 20 customers. The key columns in the dataset are:
* Service Times: Service times range from 1 to 8 units, with most customers requiring 1-7 units of time.
* Time in System: Most customers spent 2-10 units of time in the system. The customer with the longest system time spent 10 units. Idle Time: Idle time varies, with several occurrences of 0 units. there are instances of idle time reaching up to 11 units, indicating some periods of low activity.
* Customer Flow: The customer arrival times are spaced out due to varying interarrival times, leading to different waiting times and idle periods. Most customers were served efficiently with minimal delays, while a few had slightly longer waiting times.

**Methodology Used for Simulation**

1. **Input Parameters**:
   * The dataset simulates customer arrivals and service times.
   * Each customer's interarrival time and service time are recorded.
2. **Arrival and Service Timing**:
   * Arrival time is calculated based on the interarrival time for each customer.
   * Service start time is determined by either the customer’s arrival time or when the clerk becomes available after finishing the previous customer.
   * The service end time is calculated by adding the service start time and service time.
3. **System Time and Idle Time**:
   * The time each customer spends in the system is the difference between their service end time and arrival time.
   * Idle time is recorded for the periods when the checkout clerk is not serving any customers, calculated as the difference between the current customer's arrival time and the previous customer’s service end time.

**Results Summary:**

* **Average Waiting Time**: The average time customers spend waiting before they are served.
* **Average Idle Time**: The amount of time the clerk remains idle between customers.
* **Service Efficiency**: How effectively the system is minimizing idle time and serving customers promptly.