INTERNATIONAL UNIVERSITY OF EAST AFRICA
'Learning to Succeed'

FACULTY OF SCIENCE AND TECHNOLOGY

END OF SEMESTER EXAMINATIONS - APRIL 2025

PROGRAMME: MIT

YEAR/SEM: YEAR 1/SEMESTER 1

COURSE CODE: MIT712

NAME: SYSTEM ANALYSIS AND DESIGN-M

DATE: 2025-04-15

TIME: 2:00-5:00PM

INSTRUCTIONS TO CANDIDATES:

1. Read the instructions very carefully
2. The time allowed for this examination is STRICTLY three hours
3. Read each question carefully before you attempt and allocate your time equally between all the Sections
4. Write clearly and legibly. Illegible handwriting cannot be marked
5. Number the questions you have attempted
6. Use of appropriate workplace examples to illustrate your answers will earn you bonus marks
7. Any examination malpractice detected will lead to automatic disqualification.

DO NOT WRITE ANYTHING ON THE QUESTION PAPER

Section A Attempt all questions

Question 1:

a. Define the terms system analysis and system design **(4 marks)**

b. Giving an example of each, differentiate between an open system and a closed system

(4 marks)

c. With the aid of a diagram, point out any 6 elements of a system **(6 marks)**

d. Explain any 3 major constraints of a system **(6 marks)**

e. List any 4 main roles of a System Analyst **(4 marks)**

f. Explain any 4 properties of a system **(8 marks)**

g. A hospitalâ??s patient appointment system is causing long wait times and patient dissatisfaction. Describe how you would use systems analysis to identify the issues and propose a more efficient system.

(8 marks)

Section B Attempt any 3 questions

Question 1:

a) Describe the key phases of the Waterfall methodology. **(10 marks)**

b) Point out the key differences between the traditional Waterfall model and the Iterative Waterfall model? **(4 marks)**

c) Why is documentation particularly important in the Waterfall model? How does it support the development process? **(3 marks)**

d) Point out any shortfalls of the waterfall method **(3 marks)**

Question 2:

a) How does systems analysis contribute to improving efficiency and effectiveness in a business system? Use real-world examples to illustrate your points. **(4 marks)**

b) Identify at least Requirements three elicitation techniques you would use for gathering requirements from the following groups:

- Â· employees (users),
- Â· department heads (managers),
- Â· And the IT team (technical staff).
- Â· Production department (production team)

For each group, explain why you chose the technique(s) and how you would apply them to ensure that you collect comprehensive and actionable requirements. **(16 marks)**

Question 3:

a. During the development of a school management system, the team is struggling to understand how students, courses, and instructors are related. How would an ERD help clarify these relationships? **(5 marks)**

b. Create an ERD for a hotel management system. The system includes the following entities:

- **Guest** (with attributes: GuestID, Name, Address, Phone)
- **Reservation** (with attributes: ReservationID, CheckInDate, CheckOutDate, NumberOfGuests)
- **Room** (with attributes: RoomID, RoomNumber, RoomType, PricePerNight)
- **Payment** (with attributes: PaymentID, PaymentDate, AmountPaid)

Identify the relationships between these entities, Include primary keys, foreign keys, and any necessary relationships in your ERD. **(15 marks)**

Question 4:

a) What are the four components of a SWOT analysis, and how are they defined? **(4 marks)**

b) Create a SWOT analysis matrix for a business of your choice (e.g., a restaurant, tech start up, Retail Company). Describe the organisation and fill in the matrix with at least two strengths, weaknesses, opportunities, and threats. **(16 marks)**

Question 5:

a. Explain the Spiral Model in detail, including its diagrammatic representation and the significance of its loops. **(8 marks)**

b. When to use Spiral Model? **(4 marks)**

c. Explain any Selection Process Parameters for a Software Life Cycle Model **(8 marks)**

Question 6:

a) What is the role of an actor in a Use Case Diagram? Provide an example of an actor in a typical e-commerce system. **(4 marks)**

b) Explain the association, include and extend relationships in regards to use case Diagram design **(6 marks)**

c) Create a use case UML diagram for the following scenario **(10 marks)**

An automated teller machine (ATM) or the automatic banking machine (ABM) is a banking subsystem (subject) that provides bank customers with access to financial transactions in a public space without the need for a cashier, clerk, or bank teller. Customer (actor) uses bank ATM to Check Balances of his/her bank accounts, Deposit Funds, Withdraw Cash and/or Transfer Funds (use cases). ATM Technician provides Maintenance and Repairs. All these use cases also involve Bank actor whether it is related to customer transactions or to the ATM servicing.