NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY

FACULTY OF APPLIED SCIENCE

DEPARTMENT OF COMPUTER SCIENCE

SOFTWARE ENGINEERING

SCS 1214

Examination Paper

March Intake Part I Second Semester Phase II 2024

This examination paper consists of 4 pages

Time Allowed: 3 hours
Total Marks: 100
Examiner's Name: Mr J. Mutengeni
External Examiner: Dr C Gombiro

INSTRUCTIONS

1. Answer any four (4) questions
2. Each question carries 25 marks
3. Use of calculators is permissible

MARK ALLOCATION

QUESTION	MARKS
1.	**25**
2.	**25**
3.	**25**
4.	**25**
5.	**25**
TOTAL	**100**

QUESTION ONE

a) Describe the following

i) Software specification [2]

ii) Software development [2]

iii) Software validation [2]

iv) Software evolution [2]

b) Describe and explain attributes of a good software. [8]

c) Explain the fundamental software engineering activities [9]

QUESTION TWO

i. Describe the evolutionary prototype model of a software development process and state the type of development project to which this is most suited. [4]

ii. Explain two disadvantages in following an evolutionary prototyping model in a software development project [6]

iii. Describe each of the five stages of the Waterfall model of software development processes. [15]

QUESTION THREE

a) Explain the role of the following two methods in customer acceptance testing:

i) Alpha testing [4]

ii) Beta testing. [4]

b) Describe the purpose of a test plan for a software validation process. [5]

c) Explain how software verification can be achieved using the following two testing methods.

i) Unit testing [6]

ii) Integration testing. [6]

QUESTION FOUR

a) Differentiate between data-driven modelling and behavioural modelling. [6]

b) Describe and explain the risk management process. [9]

c) With the aid of a diagram explain a view model of software architecture. [10]

QUESTION FIVE

You have been asked to work on the software design for a ride-sharing mobile phone app, which matches people who require transport with drivers in the local area who have spare seats in their vehicles.

The initial system requirements include the following:

• Users should be able to register as either a vehicle owner/driver or a passenger, with a name, mobile phone, and payment details. They will be assigned a unique identification. Users who own vehicles also need to register the type, colour, and registration plate of their vehicle, along with the number of passenger seats it has.

• Passengers can request a ride from their current location to a destination of their choice. They may also specify the type of vehicle (small car, luxury car, SUV, etc.) and number of seats required. Based on their choice, the system will calculate a price for the journey.

• When logged in, drivers in the area will be notified of suitable passenger requests and given the option to accept or reject each ride. Drivers can only accept one ride at a time.

• Once a driver has accepted a passenger for a ride, the passenger will be notified of the driver's name and vehicle's details and have the option to track the vehicle's location on a map.

• The driver must inform the system when a passenger has been collected, and again when they have arrived at the agreed destination. Payment will be taken automatically from the passenger at the end of the ride. The passenger will have the opportunity to rate and give feedback to the driver through the app.

• Up until the point the driver collects the passenger, either user may cancel the ride.

a) Draw a class diagram to show the static structure of the system. [12]

b) Draw a sequence diagram to illustrate the scenario of a passenger successfully requesting a ride and being driven to their destination. The diagram should be consistent with the class diagram you drew in answer to part (a). [13]

END OF QUESTION PAPER