CROSS RIVER UNIVERSITY OF TECHNOLOGY, CALABAR
DEPARTMENT OF COMPUTER SCIENCE
FIRST SEMESTER EXAMINATIONS 2017/2018 SESSION

COURSE CODE: CSC 4104
COURSE TITLE: SYSTEMS MODELING AND SIMULATION **TIME: 2HRS**
INSTRUCTION: ANSWER QUESTIONS ONE AND ANY OTHER TWO

1) A table comprising of registered students in CRUTECH associates with others, relating to the particulars students and courses. Develop an Entity Relationship Diagram, a level 1 Data Flow Diagram, a Functional Hierarchy Diagram, and the input/output structures for this modeling arrangement.
2) Explain three major steps in building a mathematical model, using an example that cuts across the steps.
3) Briefly describe any three methods of analyzing the suitability of model in representing a system.
4) A typical Hotel provides lodging, sells food and drinks, and provides laundry services to its customers. However, the Hotel also pays its workers, who also procure the necessary items for maintaining the business. Give a name to your typical Hotel and represent its trading processes diagrammatically.

5a) Would it not be better to experiment on actual systems rather than build models? Take a position concerning this statement and defend your position.

5b) illustrate the different types of models and the type of information they provide.

CROSS RIVER UNIVERSITY OF TECHNOLOGY, CALABAR
DEPARTMENT OF COMPUTER SCIENCE
FIRST SEMESTER EXAMINATIONS 2017/2018 SESSION

COURSE CODE: CSC 4104
COURSE TITLE: SYSTEMS MODELING AND SIMULATION **TIME: 2HRS**
INSTRUCTION: ANSWER QUESTION ONE AND ANY OTHER THREE

1. A customer signs into a website and fills an intention to purchase a Book Form, by providing personal details, including, name, contact address, phone number, email, details of the book sought after, and date. Each book has ISBN, name, author, and publisher. The system then processes the request by assigning and notifying the customer of its transaction number, updating it in the database. Next, the system sends the details of the intention to the Stores Unit. On receiving the notification, the Stores Units checks the availability status of the book. If the book is available, the Stores Unit notifies the customer and the Accounts Unit of the Bank details (Bank name, Account number and name), costs of purchase and shipping for the transaction, otherwise, the customer is notified of the momentary unavailability status. When payment is confirmed, the Accounts Unit sends the details to the Stores Unit, and an Advisory to Supply the Book, which is filled by the Stores Unit as the book is dispatched. Finally, a confirmation of Receipt Form is also filled by the customer on receiving the book.

   Show a typical structure for each of the Forms sent or received at different stages of getting a book from the Bookstore. More so, develop a Flowchart, a level 1 Data Flow Diagram, and the Entity Relationship Diagram, suitable for developing software for the Bookstore.

2. A Hotel desk clerk has five goals: create reservation, confirm a reservation, and fulfill a reservation, cancel a reservation, and close a reservation. With this information develop a "Use Case" model and the context level Data Flow Diagram of the Hotel system. Using three entities including: customer, room, and reservation, develop an entity relationship diagram.
3. A prescription drug can only be dispensed by a pharmacy if there is prescription Form linking its origin to a Doctor. Hence, a prescription form should identify a hospital's name, Doctor's (name, staff number and unit), patient's (name, hospital number and type of ailment), and Drug (type and dosage). Develop a Flowchart of how the pharmacy's system should ensure that the details in a prescription Form are authenticated before a drug is dispensed.

4a) Use case modeling is an effective technique for capturing behavioral or functional requirements. Discuss the various ways that use case models are useful in modeling.

4b) Describe the importance and procedure for performing sensitivity Analysis.

5a) A software modeler will ask several questions to determine the requirements specifications for developing a software model. State and explain the keywords underlining these questions.

5b) State the steps in building a mathematical model, and illustrate each step with practical illustration.