



JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY

SCHOOL OF INFORMATICS AND INNOVATIVE SYSTEMS

UNIVERSITY EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE IN

BUSINESS INFORMATION SYSTEMS

3RD YEAR 1ST SEMESTER 2022/2023 ACADEMIC YEAR

MAIN CAMPUS

COURSE CODE: ITB 2305

COURSE TITLE: SYSTEM DESIGN

EXAM VENUE: STREAM: BUSINESS INFORMATION SYSTEMS

DATE: EXAM SESSION:

TIME:

INSTRUCTIONS

- 1. Answer Question 1 (Compulsory) and ANY other TWO questions**
- 2. Candidates are advised not to write on the question paper**
- 3. Candidates must hand in their answer booklets to the invigilator while in the examination room**

QUESTION 1 (30 MARKS)

You recently secured a job with a startup IT Company in Nairobi. You have been asked to spearhead a team of IT professionals to develop a Course Registration System (CRS) for XYZ University in Kenya. This system allows the admin to add students, faculties and any other events. It allows a faculty to enter or input student's attendance into the database which can later be viewed by students and faculties. The students can view their profile, attendance through a separate student login. They can also update their profiles. The admin and lecturers can view and update student attendance and the teaching timetables for various departments. The time table is then available to be viewed by faculties and students on the web portal. Students can enroll for courses, update their contact address, and download assignments and many others.

- a) List at least six use cases for the proposed system **(6 Marks)**
- b) Sketch a data flow diagram of CRS **(6 Marks)**
- c) Draw an ERD for the system. **(6 Marks)**
- d) Sketch a Class diagram of the system **(6 Marks)**
- e) Draw a diagram showing the input and output screen of the system **(6 Marks)**

QUESTION 2 (20 MARKS)

The Registrar Academic Affairs at JOOUST has approached your class to assist with redesigning the University Course Registration. The University management has developed a policy document that allows students to register for a fasttrack 8 week semester program in addition to the standard 14 week semester to help some students to graduate early. Additionally, students can attend courses as either Part time students (PT) in the evening or weekends. Full time students take courses from Monday to Friday between 7am to 6pm. The school admin are responsible for adding courses to the system and registering students as well.

- a) Identify the super types and subtypes in this proposed system. **(6 Marks)**
- b) Draw an ERD for the system. Your diagram should capture the subtypes and super types. **(14 Marks)**

QUESTION 3 (20 MARKS)

The governor and County CEO of health have approached you to assist with designing a health management system. You are provided with the following information: The county health facility employs a number of general practitioners (i.e. doctors) and a few receptionists. Patients are officially registered with one doctor but can arrange appointments with any available one. These appointments may subsequently be cancelled. Some appointments result in one or more prescriptions. New patients are registered by a receptionist. When a patient is registered he/she provides his/her details such as name, date of birth, address, etc., and receives a unique patient number. To book an appointment a patient should contact a receptionist. The patient provides his/her number (or date of birth) and the receptionist provides a list of available time slots for

appointments. The appointment is booked with the patient's doctor or if the patient's doctor is not available with any available doctor. The date and time of the booked appointment are given to the patient as a confirmation. Patients can cancel booked appointments by contacting a receptionist who will cancel appointments on behalf of patients. A patient who attends an appointment should check in first using a special terminal located in the waiting area of the Health Centre. The patient inputs his/her number (or date of birth). The system checks the details and confirms that the patient has been checked in. Doctors record appointment outcomes and details of prescriptions (if any) during the appointments i.e. all prescriptions issued by doctors are recorded on the patient's record.

- a) Briefly discuss the activities to be performed at the:
 - a. Design phase (5 Marks)
 - b. Implementation phase (5 Marks)
- b) Draw a use case diagram of this system. (10 Marks)

QUESTION 4 [20 MARKS]

In this case study you are required to identify the information systems requirements for a new system called Customer Management System (CMS) that should be defined from the system users' perspectives. What we want to get out of this meeting is consensus on everything the Customer Management System needs to do and who will be using each part of that functionality. Clients need to be able to service requests. Technicians need to enter their records of work on those requests. We also need to track hardware components installed in a client's equipment and software configuration information. We'll also need to be able to set up clients and even employees. One thing I think would be helpful would be for the techs to be able to view a list of their unresolved requests and view the complete history of any request and all the work done on it. As a manager I'd like to see that, too, to see what's going on. Of course, each Tech would see all of his or her own unresolved requests. I'd like to see everyone's unresolved requests. First, I should only get to any of this functionality after I logon. We want to keep this secure from people other than clients and employees. So If I view unresolved requests, the system shows me a list depending on who am I. I also think that more than just clients need to be able to add service requests. There's also the component end of it. Viewing the list of components installed in a piece of equipment. Adding a new component to a piece of equipment. Or for that matter, installing a completely new piece of equipment for a client.

- a) Identify at least six Use Cases and the corresponding actors (6 Marks)
- b) Draw a sequence diagram for one of the Use-Cases (6 Marks)

c) Using an illustration briefly discuss the Use Case Diagram for the system above (**8 Marks**)

QUESTION 5 [20 MARKS]

The Chairman of the Department of Information Systems and Technology has requested you to design a Grading System for your school. The students should be able to view grades in a given semester. The lecturer should be able to add CAT grade and Final Grade (Final Exam) to the system. The system will display the overall grade for each unit taken in the respective semester. The lecturer should be able to add both CAT grade and Final grade for each unit in the respective semester.

- a) Draw a Use-Case diagram for the grading system **(10 Marks)**
- b) Draw a Class Diagram of the system. **(10 Marks)**