

The Open University of Sri Lanka
Faculty of Engineering Technology
Department of Electrical and Computer Engineering



Study Programme : Bachelor of Science Honours in Engineering
Name of the Examination: Final Examination
Course Code and Title : EEX4347 Software Engineering Concepts
Academic Year : 2023/24
Date : 11th March 2025
Time : 0930 - 1230hrs
Duration : **3 hours**

General Instructions

1. Answer all the questions.
 2. Read all instructions carefully before answering the questions.
 3. This question paper consists of **Six (6)** questions in **Three (03)** pages.
 4. This is a Closed Book Test (CBT).
 5. Answers should be in clear handwriting.
 6. Do not use red colour pen.
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All the questions in this paper are based on the provided scenario.

Scenario:

You have been hired as a software engineer for a startup developing an **online student course registration system** for a university. The client wants an **Agile** development approach to ensure flexibility and continuous feedback. Below is a brief summary of the system that you have been provided with.

The Online Student Course Registration System (OSCRS) for a university is a web-based platform designed to facilitate the process of enrolling students in academic courses. The system enables students to browse available courses, view course details, register for classes, and manage their university course schedules through a user-friendly interface.

A university course schedule is a structured timetable that outlines the dates, times, and locations of classes for a specific academic term. It typically includes details such as Course code and title, Class days and times, Location, Course coordinators name, Exam dates and deadlines and Holidays.

Faculty staff and administrators can also use the system to manage course offerings, monitor student enrollment, and track course prerequisites. The system ensures that students only register for courses for which they meet the prerequisites, preventing conflicts and errors. Furthermore, it provides real-time updates on course availability, registration deadlines, and any changes to the academic calendar.

The platform typically includes features like student authentication, course search filters, a cart for adding courses, and the ability to check and update university course schedules. The system also supports the generation of automated notifications and confirmation emails, helping students stay informed about their registration status. Overall, the OSCRs streamlines the registration process, reducing administrative workload, increasing accessibility for students, and ensuring an efficient, secure environment for managing academic records.

Question 1 (25 Marks)

- (a) Explain **two** key principles of the Agile methodology and how they benefit the development of this system. [04 Marks]
- (b) Identify **two** requirement elicitation techniques you would use to gather requirements from university stakeholders (students, lecturers, and administrators). Justify your choices. [04 Marks]
- (c) Draw a **Level 1 Data Flow Diagram (DFD)** showing the main processes, data stores, and external entities for the course registration system. [03 Marks]
- (d) Identify **four functional requirements** that this system must meet. Justify each requirement. [04 Marks]
- (e) Provide an example of how a **use case** or **user story** can help in identifying functional requirements. [04 Marks]
- (f) Identify **three non-functional requirements** related to **performance**, **security**, and **usability**. Justify why each requirement is essential for the success of the system. [06 Marks]

Question 2 (10 Marks)

Assume that you have prepared an SRS with the requirements stated in part (d) and part (f) of Question 1. Describe how you would design a **test plan** based on the SRS to ensure the system meets the functional and non-functional requirements.

[10 Marks]

Question 3 (15 Marks)

Identify and describe **four** key classes in the **OSCRS**. Specify at least **two attributes** and **two methods** for each class. Draw a **Class Diagram** showing the relationships among the key classes identified. Use appropriate notations for associations, generalization, and dependencies.

[15 Marks]

Question 4 (10 Marks)

The university wants the **OSCRS** to be accessible from both **desktop and mobile devices**.

(a) Identify and explain **three key web technologies** (frontend or backend) that you would use to develop the system.

[06 Marks]

(b) Discuss how **client-side and server-side scripting** would be used in this project.

[04 Marks]

Question 5 (15 Marks)

The university expects the website to provide a **user-friendly experience** and handle a large number of student registrations efficiently.

(a) Discuss how you would implement form validation and user authentication to prevent invalid registrations and unauthorized access.

[10 Marks]

(b) Provide a brief **HTML and JavaScript code snippet** to validate a registration form where students enter their name, email, and course selection.

[05 Marks]

Question 6 (25 Marks)

(a) Identify **four** key entities required for this system and define their **primary keys**.

[04 Marks]

(b) Draw an **Entity-Relationship (ER) diagram** showing relationships among these entities, including cardinality.

[10 Marks]

(c) Write an **SQL script** to create the tables for **Students**, **Courses**, and **Enrollments**, including appropriate constraints such as **primary keys, foreign keys, and NOT NULL**.

[05 Marks]

(d) Write an **SQL query** to retrieve the names of students enrolled in a specific course, given the course ID.

[06 Marks]