North South University 

Department of Electrical and Computer Engineering

CSE327 – Software Engineering

**Mid-Term,** Summer 2021

Total Marks - 25, **Deadline: 07/08/2021 11:59 PM**

**Q1.** Consider the following system:

(10)

A school wants to automate their attendance taking. Attendance will be taken via a web interface. Each teacher can log in to the system and see a list of classes they are teaching. The teacher can choose one of those classes and be presented with a list of students who are enrolled in that class. The teacher can then set the attendance status of the students (present/absent) and submit the form, which should update the attendance record of the class for that time.

Students can log in and check their attendance record on a per class basis. Only the assigned teacher or the principal can give attendance for a class. In case the assigned-teacher is absent, the principal must first assign another teacher for the class for that particular day. The temporary-assigned-teacher can then take attendance for the class, only for that day. The system must record this event for cases of attendance record dispute.

A teacher may be the assigned teacher of more than one class for a given teaching period. Only the principal can change set or change the assigned teacher during the teaching period. Once a teaching period finishes, the status of the attendance records must become ‘archived’. During the teaching period each attendance record must have a status of ‘active’.

Guardians can check the attendance record of their wards online. This however is limited to only the current active attendance data. If ‘archived’ records are to be accessed, special request must be lodged online, which the principal can then approve if she/he wishes.

Draw **use case diagram** of the above system.

**Q2.** Consider the following case study:

(7)

“Springfield **University** offers a **number** of **courses**. A course contains a number of **units**. **Students** enrol and elect a **set** of units every **semester**. Students are allowed to enrol in a maximum of 5 units in any given semester. They can only be enrolled into a single course at any given **point** in **time**. However over a student’s lifetime, they may undertake a number of different courses. Each unit has a set **fee** that is set at the start of the semester. This fee is to be paid up-front in full by the students once enrolled. Some units have pre-requisite unit requirements. Some units have co-requisite unit requirements. To be enrolled in some courses, you must have completed a certain course (e.g. to enrol into a Postgraduate course, you must have an Undergraduate degree).”

Noun (**bold**)/verb (underline) analysis on the case study is marked for you to identify candidate classes, attributes, operations. Now, draw a **Specification level** Class Diagram for the case study.

**Q3.** A class named **Math** has the following methods:

(8)

| **Method** | **Parameters** | **Return value** | **Purpose** |
| --- | --- | --- | --- |
| Constructor | - | - | Create an object of Math class |
| Addition of two digits even  numbers | An array of integer | Integer | To calculate the summation of two digits even numbers in an array |
| Second Minimum element | Three  integers | Integer | Find the second minimum value among three integer numbers |

Write the code segment (the class should contain only the function header without any implementation/body) in any **OOP** language with *Pascal* casing for naming and also document the code in **XML**.