FACULTY OF INFORMATION AND COMMUNICATION TECHNOLOGIES

FALL 2023

FINAL EXAMINATION

COURSE TITLE:	Software Design and Modelling
COURSE CODE:	SE3140
INSTRUCTOR:	Engr. Mangong Clement
DATE:	
DURATION:	48 Hours

INSTRUCTIONS:

- ✓ **The paper is project oriented and consist of a single problem description**
- ✓ **Answer all questions**
- ✓ **Its individual work**
- ✓ **Create a single document word document (converted to PDF format) with all the answers, including the design diagram.**
- ✓ **Use the UML design tools where necessary**
- ✓ **Each student is required to upload their project to Moodle in accordance with the exam schedule.**
- ✓ **Take the ICT Department as the reference institution for your application**
- ✓ **Credit is given for legibility, clarity of expressions and use of relevant illustrations.**
- ✓ **Clearly write your registration number on each answer sheet used**

The task involves modeling a course allocation and time table in a higher institution considering constraints like instructor, class hall, and program during its build-up, addressing course allocation complexity. Let's say you collected the following information during your evaluation of the present system:

Less than half of the instructors' assigned courses are provided to them three weeks before the academic year officially begins. After providing feedback on their assignment, the instructor sends it back to the administration. The comment may be asking for more courses, rejecting some of the ones that were offered, or expressing other opinions. The administration then builds up a more precise course allocation using the data and additional institutional constraints, such as the instructor's skill set. For the final time, the allocation is forwarded to the teachers asking for confirmation. Following their feedback, the allocation is revised and made public.

If the instructor works part-time, they must record the potential day and time in writing. Allocating days and times for the classes and classrooms comes next in the procedure. Instructors have two days from the time it is sent to them to address any concerns they may have with the administration before it is finally published for the student body. Students have two days to submit any objections they may have to the schedule, under the direction of the student president. Students can obtain their timetable following the final release.

The timetable officer, who may be lecturer or another designated staff member, serves as the administration's representative. The organization employs both full-time and part-time teachers. At least one day off the schedule is taken by the full-time employee. Administrators who teach courses can teach up to three courses, exactly like part-time teachers. However, the maximum number of courses that full-time instructors can take is five. Only undergraduate students with levels ranging from one to three are enrolled in the institution. There should be present instructors, administrators, and students. Taking into account the aforementioned scenario and description, as well as your expertise in design, modeling, and need classification.

1. Name the four stakeholders you meet with in order to clarify your needs. 4 x 0.75 mks
2. List the user' requirement for the system that has to be developed, preferably in ten or more. 10 x 1/2 mks
3. List four primary actors in the user's requirement. 4 x 0.75 mks
4. List four secondary actors in the user's requirements. 2 x ½ mks
5. Create the system's authentication use case diagram, which should include use cases for account sign-up and sign-in. 4mks
6. Create the use case diagram for the system that will be designed for course allocation. 4mks
7. Create the use case diagram for the time table. 4 mks

8. Write the use case descriptions for the course allocation, timetable, and authentication of two chosen use cases. 2 x 2mks
9. Create the class diagram that includes modules for timetables, course allocation, and authentication. 3x3 mks
10. Use a creational, structural, and behavioural pattern to improve your class diagrams. 3 x 2 mks
11. To improve your class diagram and create the final class diagrams, apply the sound design concepts – the SOLID design principles. 3 x 3mks
12. Create the sequence diagram using the two use cases that you have chosen from the authentication class diagram. 2 x 4mks
13. Create the sequence diagram's collaboration diagram. 2 x 3mks
14. Create the state machine diagram using two selected actors. 3mks

ALL THE BEST