



THE OPEN UNIVERSITY OF SRI LANKA  
DEPARTMENT OF MATHEMATICS AND COMPUTER SCIENCE  
B.SC. DEGREE PROGRAMME 2010/2011  
FINAL EXAMINATION  
CPU2140: FUNDAMENTALS OF SYSTEM ANALYSIS AND SOFTWARE ENGINEERING  
DURATION: TWO HOURS ONLY (2 HOURS)

Date: 09<sup>th</sup> July, 2011

Time: 9.30 p.m. to 11.30 p.m.

Question 01 is compulsory. Answer *FOUR* Questions including the question 01.

Consider the following system description to answer the questions.

ABC University is a well established private university which produces Computer Science and Management graduates. The management wants to implement a software solution for the student registrations process in order to increase the efficiency of the current process. Some of the professors, administrators, and students are computer illiterate. Thus, this system, unlike the old one, must be easy to use for all concerned. The proposed process for the software solution is as follows.

At the beginning of each semester, the ABC University Registrar's Office will provide a list of courses to students through a new on-line registration system. Information about each course, such as the professor, department, and prerequisites will be included to helping students to make decisions.

The new system will allow students to review available courses and select four of them for the coming semester. In addition, each student will indicate two alternative choices in case a course becomes filled or canceled. No course will have more than ten students and no course will have fewer than three students. A course with fewer than three students will be canceled. If there are enough interested students for a course, then a second batch will be established.

The professors must be able to access the online system to indicate which courses they will be teaching. They will also need to see which students have signed up for their courses.

The Registration process will last for three days. The first day will be freshmen orientation and registration. All other students will arrive on the second day of the semester to register. The third day will be used to resolve any outstanding course assignment conflicts.

Once the course registration process is completed for a student, the registration system sends the information to the billing system, so the students can be billed for the semester.

As a semester progresses, students must be able to access the online system to add or drop courses.

Q1).

- I. While discussing the difference between functional and non-functional requirements, identify suitable functional and non-functional requirement for ABC University student registration system.
- II.
  - a. Draw the *use case diagram* for ABC University student registration system.
  - b. Identify four (04) domain classes with their attributes and methods for class diagram of the ABC University student registration system.

Q2).

- I.
  - a. What *Software Engineering* is.
  - b. Explain the advantages of using software engineering to develop the ABC University student registration system.
- II. Compare and contrast the *Generic Software Products* and *Customized Software Products*.
- III. Suggest a software product from either *generic software product* or *developing a new software product* for ABC University student registration system. Justify your answer.

Q3).

- I.
  - a. What do you mean by "*Critical System*" and briefly describe the three main types of critical systems.
  - b. Classify the ABC University student registration system in to one of the type of critical systems by giving reasons.
- II. "*The most important emergent property of a critical system is its dependability*". Comment on this statement by considering the four principle dimensions of dependability.

Q4).

- I.
  - a. Why modeling techniques are important for the software process?
  - b. Briefly describe the advantages and disadvantages in *new software models* (ex:-Agile and Rapid Application Development) than the *waterfall model*?
- II. Propose a suitable software process model for ABC University student registration system. Justify your answer.
- III. Suggest why it is important to make a distinction between identifying the user requirements and system requirements in the requirements engineering process.

Q5).

- I. What is the critical difference between a *milestone* and a *deliverable* in software process activity? Describe based on software project planning.
- II. Explain why the process of project planning is iterative and why a plan must be continually reviewed during a software project
- III. Identify the *product risk(s)* and *project risk(s)* associated with ABC University student registration system and briefly describe how they become either product or project risk.

Q6).

- I. "*Testing can only detect the presence of errors, not their absence*". Comment on this.
- II. Explain the importance of the testing for ABC University student registration system by considering the two distinct goals of the software testing process.
- III.
  - a. What are the steps that you should take to deploy ABC University student registration system in to the working environment?
  - b. Discuss the importance of the software maintenance by considering the three different types of software maintenance.

\*\*\* All Rights Reserved \*\*\*