

CSI518 Software Engineering  
**Fall 2003 Midterm Exam II**  
**October 23, 11:15 – 12:35**

The following questions concern the Statement of Need described below:

***Course Registration System:***

The college would like a new client-server system to replace its much older system developed around mainframe technology. The new system will allow students to register for courses and view report cards from personal computers attached to the Internet. Professors will be able to access the system to sign up to teach courses as well as record grades.

The college will keep the existing course catalog database where all course information is maintained. This database is an Ingres relational database running on a DEC VAX. Fortunately the college has invested in an open SQL interface that allows access to this database from college's Unix servers. The legacy system performance is rather poor, so the new system must ensure that access to the data on the legacy system occurs in a timely manner.

At the beginning of each semester, students may request a course catalogue containing a list of course offerings for the semester. Information about each course, such as professor, department, and prerequisites, will be included to help students make informed decisions.

The new system will allow students to select four course offerings for the coming semester. In addition, each student will indicate two alternative choices in case the student cannot be assigned to a primary selection. Course offerings will have a maximum of ten students and a minimum of three students. A course offering with fewer than three students will be canceled. For each semester, there is a period of time that students can change their schedule. Students must be able to access the system during this time to add or drop courses. Once the registration process is completed for a student, the registration system sends information to the billing system so the student can be billed for the semester. If a course fills up during the actual registration process, the student must be notified of the change before submitting the schedule for processing.

At the end of the semester, the student will be able to access the system to view an electronic report card. Since student grades are sensitive information, the system must employ extra security measures to prevent unauthorized access.

Professors must be able to access the on-line system to indicate which courses they will be teaching. They will also need to see which students signed up for their course offerings. In addition, the professors will be able to record the grades for the students in each class.

(Q1.) Write a testable functional requirement and a testable non-functional requirement for this system and describe how you would test them.

(Q2) Give a high level design of the system based on UML. Your design should include the use case diagram, a sequence diagram (for the use case "Register for Courses"), a state diagram (for the object "Student"), and the class diagram (include all the classes in your design.)

(Q3.) In developing this system, what would be your choice of the top priority quality attribute and what would be the most critical risk. How would you resolve such risk and how to achieve this quality requirement?

