

# Database Design

**CmpE 226**

**Assignment #1**

**Fall 2003**

**Due date: October 7, 2003**

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Read the following Problem Statement and create the following models:

1. Entity-Relationship diagram according to Entity-relationship Modeling
2. Class diagram based on Object-Oriented Modeling
3. Compare 1 and 2

Make sure to use Rational Rose or Visio for drawing the diagrams

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## Problem Statement: Online “Senior Checks” System

### **Abstract**

OSCS-Online Senior Checks System is an interactive, user-friendly system that will enable the SJSU Administrators to perform Degree audits efficiently. It also helps students to find the necessary course requirements needed for advancement towards their Degree. The system helps both the administrators and the students to identify the course requirements, report the deficiencies and advise students in taking classes to meet the requirements, choosing a major, and determining a graduation date. The system also performs administrative tasks, like updating the bulletin information and archiving the audit results.

### **Background**

The San Jose State University (SJSU) regularly performs what it calls “Senior Checks” to make sure that students that will be graduating in the immediate future have met the necessary requirements for graduation. Those requirements include the requirements of any major(s) or minor(s) as well as the general requirements of the college the student is enrolled in, all according to the undergraduate bulletin the student is following. At the present time, this process is conducted by hand and takes several months to process a single student’s request. Immediately before graduation, a student must complete a second check to finalize their status. SJSU is looking to automate this process to increase the speed, accuracy and efficiency of the senior checks. Specifically, SJSU would like to see this process available with a web-based interface that would allow University administrators quick and easy access to the program without the need

for specific software, as well as giving students access to the program to check their own progress towards graduation.

### **Existing Resources**

In the recent past, SJSU has developed several automated web-based tools related to this problem. The two most relevant resources are the WAM system and the online schedule of classes. The WAM system provides students secure access to their record of classes. The online schedule of classes provides students with access to a searchable database of the classes offered during a given class term. These two resources will most likely be helpful in the implementation of any solution to this problem.

### **Description of the program that is wanted**

SJSU is looking for the development of a program to perform the following main tasks:

1. Match the classes a student has taken against the major, minor, and general requirements.
2. Report any deficiencies in the student's requirements.
3. Show a list of classes that would fulfill the deficiencies
4. Store the results of the check for possible future reference by administrators.
5. Each time the bulletin's requirements are updated the program needs to be able to function with the new requirements.
6. An aiding tool for students in choosing their classes
7. Obtain statistical information on students and classes

### **Detailed Description**

In order to compare the classes a student has taken with those classes that are required, the program must first retrieve the student's transcript as well as the requirements for the student's major, minor, and college. The requirements depend on the bulletin year being followed by the student. A student is allowed to follow any bulletin from the academic years during which they attended SJSU. Additionally, there are several classes that may possibly count for several different requirements, such as a class that is both an IS and ES class.

Once both the student's transcript and all their requirements are retrieved, deficiencies can easily be determined. Any requirement that could not be fulfilled by any of the student's classes are reported to the user and recorded in a file.

With a list of deficiencies, the program should be able to give a list of suggested classes that will fulfill those efficiencies. That will involve searching through the schedule of classes for classes that will meet certain requirements. For example, if a student from the College of Arts and Sciences has not taken a class that meets the college's Ethnicity and Gender requirement, the program should give a list of all available classes that fall into that category.

The results of the inquiry need to be stored so that they are available to make any future check quicker and easier. Additionally, this will allow access to other users who

may possibly need the information again in the future. This is also important as a record keeping measure. If a graduate school should ever inquire about a student's undergraduate record here at SJSU, the record will be readily accessible.

Finally, as a matter of maintenance of the program, any time the requirements in the undergraduate bulletin are changed, the program needs to be able to adapt to these changes. In order to accomplish this, there needs to be a way to easily set the requirements for a new academic year, updating any requirements as needed. These updates may come from individual departments or from the colleges themselves.

### **Use Cases**

#### **1. Identifying the Course Requirements in the Major, Minor and General Subjects for Undergraduate/Graduate Students.**

Here, the user will be asked to provide the student's details, like Social Security Number or Student ID, in order to find the course requirements for the student to complete. Additional information like the Major/Minor/General, Bulletin Year, etc may be required from the user. The system will look into the database containing the relevant data and display all the relevant requirements (depending on the selection criteria). This will help the University to carry out the audit in an efficient and easy manner. This will also help the students to plan their selection of courses both efficiently and prudently.

#### **2. Reporting Deficiencies in the Students Requirements**

Due to the diversity of the courses that are being offered and also the complexity that is involved in satisfying the course requirements, it will be very helpful to have a system that will be able to identify all the deficiencies that are to be covered in order to complete the graduation requirements. When the User provides the relevant student information for which the deficiencies need to be identified, the system navigates through the database to check the classes that the student has taken. The system will then match the classes up with the requirements that have been generated earlier. If the system detects a requirement that is not fulfilled, it will report the requirement that will contain details like number of hours need to be covered in each area.

#### **3. A Tool for Undergraduate Advising**

This OSCS system could also be used to help supplement the current undergraduate advising system. Once the student's academic deficiencies are found, the student has several schedule choices to make for the upcoming semester. When registering for classes in the upcoming semester it would be very beneficial for a student to know what courses are available in the areas they are lacking. This system,