

Capstone Design Project Proposal for Software Engineering Program – AY 21/22

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Title: Personalized Academic Advising Application for Electrical Engineering program at CSUSM

Abstract:

The goal of this project is to design an application that works as an academic advisor for Electrical Engineering (EE) students. The target users of this application will be EE students. Currently, these students refer to the EE 4-year roadmap, academic advisors, and EE faculty to select courses for each semester. This application aims to make this process automatic. The students enter the courses they have passed, their interests and restrictions, and then the application provides them a roadmap for the next semesters. The purpose is to adjust the roadmap with the students interests and requirements such that the student completes the program as soon as possible. The students can use this system at any step in their program. They can change their interests/restrictions, and the application will dynamically adjust the recommended plan accordingly. This project is defined for a group of 3-4 Software Engineering students.

User 1: The EE program director

We define a user in this system who is a program director. This user enters/updates the information about the EE program courses. The application should provide an interface for this user to enter/update this information. This user initially enters this information via the application forms. They will be stored in the database and the application uses them to create educational plan for students. This user can change this information later if required.

This information includes

- (1) The list of EE program courses, their prerequisites, their category (core, elective, specialization area, etc.), the semester they are recommended to be taken in the roadmap, their alternatives in the program (if there is any), etc. If the course is an elective, the course's area of specialization in EE program (Communications, Signal Processing, Controls, Electro-physics, Microelectronics, or Power systems).
- (2) How many units are required and what courses are accepted in each category of EE program (GE courses in different areas, EE preparation, EE support courses, EE core courses, EE elective courses, and general verification requirements)
- (3) What courses are typically offered in Fall, Spring and Summer semesters.
- (4) What related courses are offered in the upcoming semester that EE students can take.
- (5) In what circumstances the student is at the risk of getting on probation or disqualified from the program.
- (6) The policy to repeat a course*.
- (7) Other related academic requirements defined by CSUSM registrar.

* Students are allowed a maximum of two repeats (i.e., 3 total attempts) per class to improve the grade (exceptions to this limit must be approved by the college Dean). An additional 12 units (beyond the 16 units of grade forgiveness) may be repeated and averaged in the GPA.

User 2: An EE student

The application gets several inputs from the student and creates the roadmap accordingly. This information will be stored at the database. The student can update them any time.

These inputs include

- (1) The courses the student has passed at CSUSM or transferred, and their grades.
- (2) The areas of interest in EE program, containing Communications, Signal Processing, Controls, Electro-physics, Microelectronics, and Power systems.
- (3) The specific courses they are interested to take, and the semesters they plan to take them.
- (4) The maximum number of units the student wants to take each semester (both GE and EE requirements). This number could be different at each semester.
- (5) In what years, the student is willing to take courses in Summers.
- (6) In what semesters, the student is willing to take Internship. How many units do they want to get credit for internship.
- (7) In what semesters, the student needs to get a leave of absence.
- (8) In what semesters, the student plans to start a new major or minor. In what program.
- (9) In what semesters, the student plans to repeat a course. What course.

Output:

The goal of this project is to dynamically create a reliable personalized study plan for the student.

This system will

- (1) provide a roadmap for the remaining semesters for the student to complete the program.
- (2) be adjusted to the student's interests, demands, restrictions and progress in the program.
- (3) be the shortest plan in terms of the number of semesters.
- (4) equally distribute the course load among semesters.
- (5) correctly hold the sequence of Math and Engineering core prerequisites with minimum break in the sequence.
- (6) accommodate the fundamental core prerequisites as early as possible in the study plan.
- (7) The application also provides other information, including the student's transcript, program GPA, cumulative GPA, the number of units and list of courses that the student has passed and will be used for their degree in each category (GE courses in different areas, EE preparation, EE support courses, EE core courses, EE elective courses, and general verification requirements).