California University of Pennsylvania  
University Course Syllabus  
Approved: Spring 2012

Department of Mathematics, Computer Science, and Information Systems

A. Protocol

Course Name: Senior Project I: Software Engineering  
Course Number: CET 490/CSC 490 (Dual Listing)  
Credits: 3  
Prerequisites: CET/CSC 265 Object-Oriented Programming with C- or better and ENG 217 Sci-Tech Writing with C- or better  
Maximum Class Size (face-to-face): 24  
Maximum Class Size (online): N.A.

B. Objectives of the Course:

Upon completion of this course the student will be able to:

1) Discuss the concept of software engineering  
2) Discuss the software crises and inherent problems  
3) Discuss the historical development of software engineering  
4) Discuss the role of the software engineer  
5) Discuss human factors involved in the software engineering process  
6) Discuss software qualities  
7) Discuss software engineering principles  
8) Describe the uses and qualities of a software specification  
9) Write a requirements document  
10) Write a specification document  
11) Write a design document  
12) Discuss the goals and requirements of software verification and validation  
13) Discuss the process of software testing  
14) Discuss various software life-cycle models  
15) Write and present to the class a paper on a software engineering topic  
16) Discuss the function of a software engineering team manager  
17) Apply project planning and teamwork skills  
18) Discuss the historical evolution of software engineering tools  
19) Discuss the role of programming language in the software engineering process  
20) Learn at least one new technology  
21) Explain the need for lifelong learning in the profession.

C. Catalog Description:

This course introduces students to software engineering. They will study its history, terminology, requirements, specifications, and design. The students will write requirements, specifications, and design documents, and one or more papers on software engineering topics. Prerequisite: CSC 265 Object-Oriented Programming with C- or better and ENG 217 Sci-Tech Writing with C- or better. Fall. Three credits.

D. Outline of the Course:

1) Introduction to Software Engineering  
   a. Definitions  
   b. History  
   c. Role of the software engineer

2) Software Engineering Topics  
   a. Software life cycle (various models)
b. The software crisis
c. Human factors
d. Team organization (centralized versus decentralized)
e. Historical evolution of software engineering tools
f. Role of programming languages

3) Software Qualities
   a. Correctness
   b. Reliability
   c. Robustness
   d. Performance
   e. User friendliness
   f. Verifiability
   g. Maintainability
   h. Repairability
   i. Evolvability
   j. Reusability
   k. Portability
   l. Understandability
   m. Interoperability
   n. Productivity
   o. Timeliness
   p. Visibility

4) Software Engineering Principles
   a. Rigor
   b. Formality
   c. Separation of concerns
   d. Modularity
   e. Abstraction
   f. Anticipation of change
   g. Generality
   h. Incrementally

5) Software Specification
   a. Specifications document
   b. Module specification
   c. Uses of specifications

6) Software Life-Cycle Models
   a. Design for Change

7) Verification and Validation
   a. Goals and requirements
   b. Software testing
   c. Test cases
   d. Testing in the small
   e. Testing in the large
   f. White box testing
   g. Black box testing

8) Management of Software Engineering
   a. Planning and organizing
   b. Staffing
   c. Directing
   d. Controlling
E. Teaching Methodology:

1) Traditional Classroom Methodology:
This class will be taught using the lecture/discussion method. Students will work in teams as in a real-world software engineering environment. Students will produce several documents including a software definition, software specification, and design document.

During each phase of the project (CET/CSC 490 and CET/CSC 492), a student will be responsible for leading their team. Each student will lead at least once. The phases are:

- Specification
- Design
- Implementation
- Requirements & User Manual

2) Online Methodology:
This course will not be taught online.

F. Text:

G. Assessment Activities:

1) Traditional Classroom Assessment
The final grade will be determined as a percentage from the following evaluation methods with varying weights at the discretion of the instructor:

- Examinations
- Quizzes
- Assignments
- Programs
- Attendance
- Performance

Writing assignments will contain several documents varying from 10 to 20 pages in length that each student will be required to write. There will be several documents varying from 50 to 100 pages in length that will be written by each software engineering team (generally, four to six students). The proposals may be revised and resubmitted after they are reviewed by the instructor.

2) Online Assessment
No online assessments will be given.

H. Accommodations for Students with Disabilities:

**Accommodations for Students with Disabilities**

Students with disabilities:

- Reserve the right to decide when to self-identify and when to request accommodations.
- Will register with the Office for Students with Disabilities (OSD) each semester to receive accommodations.
- Might be required to communicate with faculty for accommodations, which specifically involve the faculty.
- Will present the OSD Accommodation Approval Notice to faculty when requesting accommodations that involve the faculty.
Requests for approval for reasonable accommodations should be directed to the Office for Students with Disabilities (OSD). Approved accommodations will be recorded on the OSD Accommodation Approval notice and provided to the student. Students are expected to adhere to OSD procedures for self-identifying, providing documentation and requesting accommodations in a timely manner.

Contact Information:
- Location: Azorsky Hall – Room 105
- Phone: (724) 938-5781
- Fax: (724) 938-4599
- Email: osdmail@calu.edu
- Web Site: [http://www.calu.edu/current-students/studentservices/disability/index.htm](http://www.calu.edu/current-students/studentservices/disability/index.htm)