Revised
Graduate
Software Engineering Curriculum
at
Monmouth College

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Background

Monmouth College has been offering courses in Software Engineering at the graduate level for the past three years and two years ago began a fully accredited Master's program in Software Engineering. Two students completed the degree requirements during the summer of 1987, and it is expected that thirty students will complete the program of study during the summer of 1988. There are currently seventy-five students enrolled in the program; most of whom are part-time students taking from one to three courses each term. At the present time, 65% of the students are male, and the average age is twenty-five. All courses in the program are offered during the day and meet one day each week. Almost all the students are sponsored (Their tuition is fully paid, and they are granted release time to attend classes.) by local high technology firms. The list of participating organizations (those sponsoring five or more students) includes AT&T Bell Laboratories, AT&T Information Systems, Concurrent Computer Corporation, and Fort Monmouth.

A Software Engineering Curriculum Advisory Board, has assisted in the development and refinement of the curriculum and courses. The Board contains members from local high technology industries involved in the production of software. The current membership includes representatives from AT&T Bell Laboratories, AT&T Information Systems, Concurrent Computer Corporation, Fort Monmouth, Syntrex Corporation, Lakehurst Naval Air Engineering Center, Lockheed Corporation, and Picatinny Arsenal. The Board meets twice a year to review and discuss the curricular issues concerning software engineering. Generally, it is concerned with theme and direction rather than with individual course syllabi. Considerable discussion has taken place relative to the system-engineering concepts of requirements and specifications and with the concept of computer
communications and security. Because of the special interests and concerns of the local area, the revised program has special emphasis on those topics.

The Board also expressed considerable support for the team-project approach. It recognized the need to develop a library of large software systems case studies with supporting requirements, specifications, and configuration documentation. There is considerable difficulty in producing such material. The Board is continuing to look for ways to assist in the development and acquisition of such library materials.

As originally conceived, the program consisted of ten required courses. The courses were designed to cover four general areas: basic computer science, human factors, engineering principles, and computer communications. Throughout the curriculum, emphasis was placed on group projects and team solutions. Whenever feasible, course assignments were made on a group, project-team solution format. As a result of the first two years of experience, the program is undergoing major revision along several lines. Instead of a fixed program of study, more courses will be available, thus students will be able to tailor their program of study to better match their interests and needs. Although many of the original courses, being of fundamental importance, will continue to be a part of the program, the revised program has introduced a number of new and original courses (There will be two new courses on mathematical foundations, two courses that will present a different approach to teaching programming, a new laboratory course, and a very nontraditional course in principles of software engineering). This paper presents a rational for and a description of the revised program that is expected to be in effect by September.

The program is jointly sponsored by the Electronic Engineering Department and the Computer Science Department. A curriculum committee consisting of members from both departments reviews and monitors the curriculum; software engineering faculty hold joint appointments with one of the two departments designated as the home department for administrative purposes. It is anticipated that consideration will be given to providing separate department status to software engineering when the program reaches full enrollment objectives (50 FTE students) and full staffing.

Introduction

The term "Software Engineering" was coined around 1968 [1] to describe what was at the time a somewhat vaguely formulated approach to the solution of what was called "the software crisis." The "crisis" referred to the serious problems that were beginning to surface at the time concerned with the development of large software projects. The "problems"[2] can be summarized by: "The systems were delivered late." "The resulting systems did not meet customer expectations."