THE SOFTWARE ENGINEERING PROGRAMS AT GEORGE MASON UNIVERSITY

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INTRODUCTION

The Commonwealth of Virginia, through its Center for Innovative Technology, has provided funds to establish an academic program in software engineering at George Mason University. This paper describes our plans for the teaching, research, and technology transfer components of that program.

The program is housed in the School of Information Technology and Engineering at GMU. The School consists of four departments: Electrical and Computer Engineering; Computer Science; Operations Research and Applied Statistics; and Information Systems and Systems Engineering. In the School there are 3 undergraduate degree programs, five Masters programs, and one Ph.D. program in Information Technology which serves all four departments. The Master of Science in Software Systems Engineering degree program will be housed in the Department of Information Systems and Systems Engineering. Doctoral students in software engineering will utilize the existing Ph.D. program in Information Technology.

In addition to the four departments, the University has established a Center for Software and Systems Engineering within the School. The role of that Center as the research and technology transfer arm of the software engineering program is described below.

THE MASTERS PROGRAM

The Master of Science in Software Systems Engineering (MS-SWSE) program will consist of four core courses, four electives, and a two semester project or a six credit hour thesis, for a total of ten semester length courses of three credit hours each. The core courses are Introduction to Software Systems Engineering; Analysis, Prototyping, and Design; Formal Methods and Models in Software Engineering; and Software Project Management. A catalog description of each core course is provided in Table I.

A short list of permissible electives, from which each student will choose four, will be provided. Some elective courses are listed in Table II. It is anticipated that many of the elective courses will be offerings from other departments, and that many of the software engineering courses will provide desirable electives for other programs. Different sets of electives will be appropriate for students who plan to do technical work, to be managers, or to pursue doctoral studies. Most students will be encouraged to pursue the project option (working in teams) rather than a thesis and to work on group projects in the Center for Software and Systems Engineering.

Prerequisites for the MS-SWSE program include the following undergraduate courses or equivalent knowledge: structured programming in a modern programming language, data structures, discrete math, and assembly language/architecture. In addition, it is desired that students have two years of appropriate work experience in the software field upon matriculation.

Our plan for introducing the MS-SWSE program is to first offer the four core courses in Fall Semester, 1988. Both Systems Engineering and Computer Science will cross-list these courses and make them available to their Masters students who wish to specialize in software engineering. Students in each department will take the usual core requirements in their respective programs plus the four core courses and a project course in software engineering as the elective courses in their programs. In general, a rich interconnection of course sharing is anticipated among the various departments and programs in the School.

Work toward approval of the MS-SWSE degree will progress during the 1988-89 academic year. We anticipate approval by the Fall Semester, 1989.

THE CERTIFICATE PROGRAM

Individuals who have a Masters degree in a scientific or technical discipline from an accredited university are eligible for the Certificate Program in software systems engineering. Each applicant must also have the prerequisites for the MS-SWSE program (i.e., structured programming, data structures, discrete math, assembly language, and two years work experience). In order to obtain the Certificate, students must complete the four core courses and a one semester project course, for a total of 15 semester credits of graduate study.
The Certificate program is thus a post-Masters program that corresponds to roughly one-half of a Masters program in software engineering. We anticipate that the Certificate program will be attractive to those who are trained in other disciplines and who now find that their work is primarily in software engineering.

THE PH.D. PROGRAM

The existing Ph.D. program in Information Technology serves as the single doctoral program for all students in the School. Doctoral students complete a set of breadth courses from the various departments in the School and, following successful completion of qualifying examinations, specialize in their chosen fields of endeavor. Each student is required to take a minimum of 24 credits of course work beyond the Masters program. Doctoral courses in software engineering to be introduced in the next one to three years are listed in Table III.

RESEARCH AND TECHNOLOGY TRANSFER PLANS

The Center for Software and Systems Engineering is the research and technology transfer component of the software engineering program at George Mason University. The overall goal for the Center is to develop innovations in software technology and diffuse those innovations into industry, governmental agencies, and educational institutions. In order to achieve this goal, the Center will conduct