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Videotape-based Graduate Programs in the U.S.A.

J. S. BOLAND†
Auburn University, AL 36849, U.S.A.

Video-based graduate-level distance education, pioneered in the U.S.A. in the 1960s, came of age in the 1980s and promises to be the wave of the future for the 1990s and beyond. This paper describes videotape-based programs in the U.S.A. with emphasis on the program at Auburn University.

INTRODUCTION

MOST major 4-year educational institutions within the U.S.A., particularly land-grant institutions, have instruction, research and extension as their major missions. Through their undergraduate colleges and graduate schools, these institutions seek to create and implement effective programs of education and service on their campuses and also to extend their scientific and cultural resources off campus to individuals, communities, industries, and other institutions. Thus, their mission is fulfilled in an improved technology, better environment and health conditions, enhancement of the general level of living and the development of more responsible citizenship.

In the late 1950s, and in the 1960s educational institutions began using television as a medium for extension. It was not until the late 1970s and early 1980s, however, that use of television became economically feasible for most institutions. In addition to the financial consideration, the television medium came of age in the 1980s in engineering for the following reasons: exponential expansion of technology created a need for continuing education (both credit and non-credit) for engineers that demanded delivery in innovative ways; the smaller percentage of U.S. engineering graduates choosing to continue their education immediately upon graduation, primarily because of the larger starting salaries offered by industry, created an increased need for delivery of credit and non-credit continuing education at work sites; the generation of engineers graduating in the 1980s had a greater acceptance of television as an educational medium because they had grown up in front of a television set; increased industrial competition, caused by the movement from a U.S.-based economy to a world-based economy, demanded new ways to shorten the time delay from conception of new technology to application, thus forcing closer ties between U.S. industry and engineering educational institutions; and finally, companies came to the realization that continuing education for their engineers is a requirement and that television is a financially attractive method for achieving this goal.

Innovative techniques for delivery of education include the following: instructional television fixed service (ITFS) using microwave transmission and requiring a broadcasting license; video tapes; narrow-band transmission over telephone lines; satellites; interactive video using computers; and fiber-optic cables. This paper discusses the videotape medium used by the College of Engineering at Auburn University and by a number of other institutions. The program described herein is similar at all institutions using videotape.

ENGINEERING OUTREACH PROGRAM

The College of Engineering of Auburn University, a land-grant university within the state of Alabama, has a requirement not only to provide teaching and research opportunities to on-campus students but also to provide, through its extension activities, the opportunity for off-campus students to participate in a lifelong educational process. The extension activity of the college also provides a mechanism for employees of governmental and industrial organizations to keep abreast of changes in technology that are occurring at a rapid pace.

The Continuing Engineering Education (CEE) Program is an academic service unit responsible to the Dean of Engineering. The purpose of CEE is to provide leadership in the stimulation and promotion of lifelong engineering education for the state and region; to encourage lifelong participation in education by engineers, scientists, and technical managers; to plan and develop quality lifelong education programs; and to plan and develop innovative policies and procedures specifically

† Associate Dean of Engineering for Continuing Engineering Education.

pertaining to all aspects of lifelong engineering education.

The College of Engineering at Auburn University began offering graduate-level courses for credit to off-campus students via videotape during the Spring Quarter, 1984. Because the program is an effort to 'reach out' to industry and engineers in the region by extending classrooms beyond the campus, it has been given the name Engineering Outreach Program.

The Engineering Outreach Program offers students in industry the opportunity to take graduate-level, state-of-the-art courses in engineering disciplines at their work site. During the 1989–90 academic year, courses were offered in the disciplines of aerospace, chemical, civil, computer science and engineering, industrial, manufacturing systems, materials and mechanical engineering.

Through the Engineering Outreach Program, off-campus students can receive the same quality instruction offered to on-campus students. Advantages of this program include instruction at the plant site via videotape by College of Engineering resident graduate faculty; classes offered at schedules convenient to the individuals taking the course at each plant site; the convenience of viewing the tape for a missed class because of illness, work schedule, or travel (one should never miss a lecture when taking a course in this program); and the ability to review the tape of a lecture for better understanding.

DESCRIPTION OF PROGRAM

The graduate faculty in the College of Engineering is making every effort to ensure that the off-campus program has the same quality as the on-campus graduate program. A graduate-level course being offered off-campus through the Engineering Outreach Program is taped in a video classroom while the on-campus class is being conducted by the graduate-faculty professor.

Tapes in either $\frac{3}{4}$ in. U-Matic or $\frac{1}{2}$ in. VHS format are mailed on the day of the class and are available at plant sites usually on the day following the on-campus class. The tapes may then be viewed by students at each site at a time convenient for them and the site coordinator. Missed classes may be viewed at a later time as arranged by the student and site coordinator. Off-campus students are expected to complete the same homework assignments and take the same exams as on-campus students. In effect, off-campus students are in the same class and receiving the same quality instruction as on-campus students.

Faculty members teaching courses in the Engineering Outreach Program establish telephone hours during which time off-campus students may call to ask questions. Professors give answers over the phone and typically start each lecture by restating and answering all questions received since the last class in order that all students may have the benefit of the questions and answers.

Off-campus students must maintain the same pace as on-campus students. Homework must be mailed back to the professor according to his or her schedule and exams must be taken at the designated time (except in cases cleared in advance with the professor). All exams are monitored by the site coordinator.

Two types of degrees may be pursued by off-campus students. The Master of Science degree, offered in eight disciplines, requires a formal written thesis and at least one quarter of full-time residence. The Master of Aerospace Engineering, Chemical Engineering, Civil Engineering, Computer Science and Engineering, Electrical Engineering, Industrial Engineering, Manufacturing Systems Engineering, Materials Engineering and Mechanical Engineering are non-thesis programs which have no residence requirement. Course requirements for doctoral degrees in some disciplines may be earned through the Outreach Program with prior approval of the department.

PROGRAM RESULTS

The Auburn University Engineering Outreach Program offered its first class to one student in the Spring Quarter, 1984, in order to work the bugs out of the system. The program formally started with the Fall Quarter, 1984, and has grown to the point of offering 100 courses during the 1989–90 academic year as shown in Fig. 1.

The number of students who have been accepted into the Graduate School and are actively pursuing a degree in the program has grown to 120 (Fig. 2). The total number of students involved in the program is higher when students who have not applied for admittance to the Graduate School but are taking courses in a non-degree post-baccalaureate status are included. Engineers at over 80 companies have taken courses in the program.

As of the end of the Spring Quarter, 1990, ten Engineering Outreach Program students have successfully completed their degrees, including one Ph.D. graduate. Because most students take only

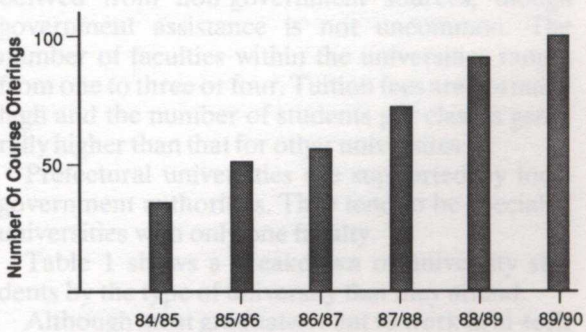

Fig. 1. Growth in number of courses, 1984–90.

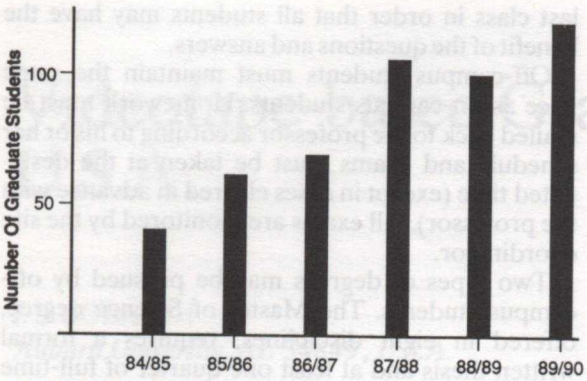

Fig. 2. Growth in number of students, 1984–90.

one course per quarter, 3–4 years are required to complete the requirements for a Masters degree. Thus the program is just beginning to produce graduates on a regular basis.

The performance of students enrolled in the program has been slightly better than on-campus students enrolled in the same courses. From spring 1984 through spring 1989 the cumulative grade point average for Engineering Outreach Program students is 3.33 compared to 3.30 for on-campus students enrolled in the same classes. This statistic reflects credit on the quality of the program.

Overall, the College of Engineering is pleased with the Outreach Program results to date and expects the program to grow significantly over the next five years.

J. S. Boland received the Ph.D. degree from the Georgia Institute of Technology in Electrical Engineering and is currently Associate Dean of Engineering for Continuing Engineering Education at Auburn University.