

An Alternative Technology-Based Mathematics Curriculum

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Grant Number: DUE–9552147

The purpose of the ILI grant our department received in Summer 1995 was to support our vision of an alternative technology-based mathematics curriculum that any technical major could pursue at least through the sophomore year. The courses affected by this project include three standard lower division sequences: College Algebra and Applied Calculus for business majors; Precalculus, Calculus I, and Calculus II for physical science majors; and Linear Algebra and Discrete Math for math and computer science majors. These sequences form the three branches of a technology track. Courses in each branch are vertically coordinated to ensure continuity of instructional delivery, classroom activities, testing, and technology and software. Students are free to move on or off the track to more traditional sections at any time, although they are advised to remain on track. Grant moneys were used to equip a new classroom laboratory of PCs and upgrade a previously existing classroom.

This project is an outgrowth and extension of two other NSF-funded reform projects in which the department has recently participated. The first of these, the so-called Interactive Math Text Project, was a nationwide effort whose goal was the development of potent examples of mathematics courseware using widely-available computer algebra systems such as *Maple* and *Mathematica*. The second project was a local attempt to develop a revised syllabus for College Algebra based on unifying themes, technology, and laboratory experiences. As a result of these projects, the department had developed a good deal of original course material and offered many reform-style or technology-based sections, but on a scatter shot and pilot basis, as resources permitted, rather than according to a coordinated scheme. Students usually were forced to follow a lab-based, computer-intensive section with a traditional lecture section, or vice versa. We felt that the natural differences in presentation styles, modes of assessment, and emphasis on numerical versus analytical techniques must be disruptive for students, especially for under prepared students for whom even superficial inconsistencies can be distracting. We believe it is crucial that students be given the chance to reap the rewards of instructional modes specifically designed to improve their mastery and alter their perception of mathematics. Without a comprehensive strategy, we felt it would be impossible to gauge the true long term impact of technology and lab experiences on mathematical literacy and retention, either here or in similar programs. In our presentation, we hope to demonstrate the general equipage of our two laboratories, the common design framework that is used to create or adopt courseware in each branch of the technology track, the ways in which courses in each branch are interfaced and coordinated, and the role the software plays in each course. Plenty of sample courseware, both software and textual material, will be displayed.