

## **Building a Foundation for Pre-calculus Engineering Freshman Through An Integrated Learning Community**

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Departmental records show that as many as 40% of students who self-identify as computer science or engineering majors have to take Math 115, Intermediate Algebra. This math level as a starting point represents a serious barrier to student success in the engineering majors. In order to take courses in these majors, students need to be at least co-registered in Calculus I. For students who place into Math 115, this may take as long as three semesters as these students must first successfully complete Math 115, then take Intermediate Algebra (Math 185) and Trigonometry (Math 180) before they can register for Calculus I. Complicating the lack of preparation for calculus, one of the factors impacting students' ability to successfully complete Math 115 is the lack of concrete connection to relevant discipline-specific problems. This is a particularly alienating experience for these students as they are unable to enroll in engineering courses for as long as three semesters, further delaying the opportunity for engineering-specific, learning experiences to take place.

Beginning in February 2003 the William and Flora Hewlett Foundation funded a five-year project designed to address this and other barriers to engineering students at NMSU. The freshman engineering integrated learning community (ILC) is a cluster of 23 first-semester students who are beginning their engineering studies below the Calculus I level. The students are enrolled in Intermediate Algebra (Math 115), supplemental instruction in math (CE 198), Freshman Composition (Engl 111), a freshman engineering seminar (SMET 101), and a general engineering class (EE 110). In the Spring 2004 semester the ILC will include courses in Intermediate Algebra (Math 185), supplemental math instruction (CE 198), General Chemistry (Chem 111), Engineering Ethics (Phil 240G), and Introduction to Engineering Design (SMET 102). The cluster sequence is designed to integrate the coursework to ensure that during the first year students develop a strong foundation in algebra, writing and problem solving skills, and engineering analysis and design. The instructors of the cluster courses meet regularly to share insights about the progress of the students and to coordinate activities in ways designed to improve student learning in all the courses. An assessment team is also developing a writing-based testing instrument to trace student progress in understanding the design process.

This presentation will discuss the experience with the cluster and the results of integrating the Fall 2003 ILC through a common design project. The presentation will also preview the activities of the Spring 2004 ILC.