

Bridges for Engineering Education (NSF 02-092)

NSF Directorate for Engineering (ENG) and Directorate for Education and Human Resources (EHR)
University of Georgia – Summer Engineering Education Institute

Project Summary:

The primary focus of this one-year project is to design and develop a model summer engineering education institute focusing on integration of engineering content with mathematics, science, and technology education that could motivate academically qualified high school 12th graders to seriously consider engineering majors in college. It is our intent to help stimulate the inclusion of significant engineering related instructional content within the public school curriculum. Our institute model will work to build teams of educators at various levels (teacher educators from mathematics, science, & technology education, engineering educators, in-service teachers, pre-service teachers, undergraduate engineering students, and secondary students). The teams will participate in a variety of classroom and lab-based experiences along with field trips and motivational speakers that focus on engineering concepts to illustrate real-world applications of mathematics, science, and technology. Participants would be introduced to innovative strategies for using engineering concepts and applications in secondary instruction and would develop engineering enhanced instructional materials and strategies to be tested in public schools in the months following the institute.

The anticipated products from the summer institute will be as follows:

- An activity book consisting of detailed descriptions of and instructions for numerous classroom experiments, investigations, and projects that can be used by teachers and students as they engage in the study of integrated mathematics, science, and technology with a focus on engineering education.
- A dedicated Web site that provides activities for students, resources for teachers, and on-line assessments for use in engineering related instruction. The materials developed will be interactive and engaging with the focus directed to engineering concepts and applications.
- Two (2) separate and independent secondary school programs working to engage teachers and students to integrate mathematics, science, and technology as they apply their knowledge to solve real-world engineering problems.
- Teacher educators will conduct research during the months following the summer institute at the 2 public high schools where in-service and pre-service teacher teams along with participating secondary students will be working to apply concepts and applications learned during the summer institute. A primary objective of the research will be to follow-up the participating secondary students to determine the directions they take in college major selection.
- Assessment of teacher education curriculum. Teacher educators and engineering educators associated with this project will conduct a curriculum assessment of their instructional programs to evaluate possible changes in course content and instructional strategies for the purpose of enhancing learning objectives.
- Evaluation of the summer engineering education institute providing project staff with data to use in the re-design and organization of subsequent summer institutes. It is anticipated that the results of the summer institute can be broadened and applied in a larger scale in different regions of the United States.
- Presentation of the results of the project activities (summer institute and research) will be given at numerous professional education/engineering association meetings (e.g., International Technology Education Association, Council on Technology Teacher Education, Georgia Technology Education Association, American Society of Engineering Education).