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ACCOMPLISHMENTS

1. Develop senior design problems to solve real problems

Following is the list of the senior design problems for the last two years. We want to improve on the quality of the designs and give the students “real-world” design experiences.

1999-2000 Senior design project (2-3 students per design team)

- Design of an Animal Watering System in Senegal
- Design of a Bioremediation System for Creosote Clean-up Site
- Design of a Site Plan for a Small Vineyard
- Design of Composting Facility for Virginia Tech
- Design of a Processing System to Produce Calcium Magnesium Acetate
- Design of a Waste Management System for Virginia Tech Dairy Center
- Design of a Small Xylitol Production Facility

1998-1999 Senior design projects (2-3 students per design team)

- Strubles Creek Bank Stabilization and Wetland Design
- Conceptual Site Design for Botetourt County Landfill
- Design of a Small-scale Pasteurization Unit for Apple Cider
- Rural Recreation Pond Design
- Design of a Water Distribution System Using Mine Water for the Sullivan Community in Dickenson County, Virginia
- Integration of Limiting Factors in Food Processing Machinery
- Design of Device to Measure Scoopability of Ice Cream
- Decontamination of Fruits and Vegetables Using Ozone
- Water Supply Management for Irrigation and Aquaculture
- Selenium Removal From Agricultural Drainage Water
- Design of an Aquaculture-Hydroponic Integrated Bio-System

2. Increase design experiences throughout the curriculum

The following small-scale design problems were developed for inclusion in the sophomore BSE 2105-2106 course sequence. Some of these and additional design problems are being developed and will be placed in selected BSE courses.

- Design, construct, and test the performance of a mixer for dry granular material given Plexiglas tubing, Plexiglas sheet, construction lumber, and perforated steel angle iron.

- Design a device for displaying framed pictures on a brick surface without damage to the brick surface.
- Design, construct, and conduct performance tests of a gravity-flow liquid applicator system that will yield varying flow rates and constant flow rates.
- Design, construct, and test the performance of a device that demonstrates conservation of mass and energy in a system having two sources of heated water at two temperature levels with the capability of varying and measuring the flow rate of the two water sources.
- Design, construct, and test the performance of a model bin with a bottom that provides satisfactory flow from it when filled with a dry granular material.
- Design, construct, and fully evaluate the performance of an aerobic waste compostor of sufficient size to meet the demands of a single residence, all within a budget of \$250.00
- Test the performance of an existing rainfall simulator and determine the effectiveness of various surface treatments to reduce contamination in the runoff.
- Extract the oil from cottonseeds and treat by several prescribed methods to obtain desired oil quality.

ASSESSMENTS

We were successful in creating design problems for the seniors that gave them practical experiences and required them to solve real problems. We feel there is benefit in providing a wide range of design problems so that students can select a design problem in their emphasis area within the Biological Systems Engineering program. Most of these designs, especially in the Land and Water emphasis area, are of a very extensive nature and cannot possibly be constructed which we consider to be a disadvantage.

We were able to develop eight new experiences for the sophomores and include them in BSE 2105 and 2106. All of the developed activities listed above were considered to be successful and will be included again next year.

PLANS FOR NEXT YEAR

Dr. Wilson and Dr. Haugh plan on traveling throughout Virginia this summer to identify more design problems for the seniors that will also solve actual problems.

We plan on reviewing the possibility of creating one large design problem for 2001 that can be divided into smaller design problems and have all seniors work on the same general design problem. They will still work in teams but each team will design some identifiable sub-system that must be incorporated into the over-all design.

We will propose that the sophomore BSE 2106 course be changed slightly. It currently is a 2-credit-hour course that includes several design problems and BSE and engineering calculation procedures. The changes to be studied include 1 hour of several small design problems and then the other 1 hour consisting of a 3-hour laboratory, be devoted to participation in a comprehensive senior design problem.

Additional small-scale design problems will be developed and these, along with those recently developed for BSE 2105 and BSE 2106, will be reviewed and a decision made as to where they will best fit into the total BSE curriculum.