

AGRICULTURAL AND BIOLOGICAL ENGINEERING (ABE)

ABE 500: Research Methods

3 Credits

Foundation in research philosophies, methodologies, issues and policies; measures of research quality; critical thinking and discourse; research report writing; professional development; research ethics. A B E (BRS) 500 Research Methods (3) A B E/BRS 500 is a course designed to assist students entering and advancing in their research career to: better investigate and practice the art of scientific investigation; openly explore and discuss what it means to be a part of the scientific and research enterprise at a major academic setting; gain skills and experiences in critical evaluation and discourse; learn the process of developing and preparing a research proposal from initial concept to near-final written product; better understand the expectations for responsible and ethical conduct as a scientist/student/individual; and further develop their philosophies and capabilities as future scientists and professionals. During this course students will continually read, think, discuss, write, critique, re-read, re-think, re-write, and communicate with other students, faculty, and professionals. The course will provide a setting to allow them to further develop their personal, professional, academic, and scientific goals and capabilities.

Cross-listed with: BRS 500

ABE 504: Mechanics and Properties of Particulate Materials

3 Credits

Constitutive equations for cohesionless and cohesive particulate materials; measurement of properties; application to storage, flow, and consolidation.

ABE 513: Applied Finite Element, Finite Difference, and Boundary Element Methods

3 Credits

Applications of numerical methods in the areas of structures, fluid dynamics, heat and mass transfer, and machine design.

ABE 517: Surface Transport of Agricultural Pollutants

3 Credits

Understanding and modeling the surface transport processes of agricultural pollutants; particularly erosion, sediment transport, and movement of sediment-attached constituents.

ABE 559: Biological and Agricultural Systems Simulation

3 Credits

Continuous simulation modeling of biological and physical systems, numerical simulation techniques, validation and verification, difference measures, sensitivity analysis. A B E 559 A B E 559 Biological and Agricultural Systems Simulation (3) This course enables the student to better understand system behavior and prediction, with a focus on biological and physical systems. Using a diagramming-based model

development package and standard spreadsheet programs, the student will be able to: identify a system, labeling components, boundaries, and environment; represent a system in mathematical terms; develop a working simulation model; evaluate a model through statistical means. The applications used within this course are oriented towards graduate students in the Colleges of Agricultural Sciences and Engineering. The course is offered every Fall semester, with an expected enrollment of 10 students. Grading is based on homework and in-class assignments, and a final project.

Prerequisite: MATH 111 or MATH 141

ABE 568: Food Safety Engineering

3 Credits

Predictive microbiology and modeling, conventional and novel detection and enumeration methods, conventional and novel processing methods, applied to plant layout, construction materials, and equipment design for microbial food safety. A B E 568 A B E 568 Food Safety Engineering (3) This course introduces diverse topics in microbial food safety from an engineering perspective. Topics include the following: the roles of engineering, plant layout, construction materials, equipment design, predictive microbiology and modeling, conventional and novel detection and enumeration methods, conventional and novel processing methods, emergency contingency plans, and current responsibilities and regulations of federal agencies for food safety. Students will be evaluated through homework, exams, design project reports and presentations. The course will be offered every other Fall semester with expected enrollment of 10-15.

Prerequisite: A B E308

ABE 587: Computational Ecohydrology

3 Credits

Ecohydrology is an integrative science that studies mutual interactions between hydrological, biogeochemical, and ecological processes. The lectures of the course will discuss the fundamental processes controlling the flow of water in the biosphere (in land, atmosphere, soil, and plants) and the interactions with ecological processes, implications of ecohydrological feedbacks covering broad range of issues including global environmental change, land use change, global desertification/land degradation, urbanization, soil erosion, and the food-energy-water nexus. The computational lab will provide hands-on experience on ecohydrological analysis with geographic information system software and ecohydrologic model. The course will also introduce students to parallel computing and optimization methods.

Recommended Preparation: Previous coursework in hydrology is expected

ABE 590: Colloquium

1-3 Credits/Maximum of 3

Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

ABE 596: Individual Studies

Prerequisite: A B E884

1-9 Credits/Maximum of 9

Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

ABE 597: Special Topics

1-9 Credits/Maximum of 9

Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

ABE 600: Thesis Research

1-15 Credits/Maximum of 999

No description.

ABE 601: Ph.D. Dissertation Full-Time

0 Credits/Maximum of 999

No description.

ABE 602: Supervised Experience in College Teaching

1-3 Credits/Maximum of 6

Supervised experience in development of instructional materials, organizing and conducting lectures, laboratories, and evaluating students in undergraduate Agricultural Engineering courses (1-499).

ABE 610: Thesis Research Off Campus

1-15 Credits/Maximum of 999

No description.

ABE 611: Ph.D. Dissertation Part-Time

0 Credits/Maximum of 999

No description.

ABE 884: Biomass Energy Systems

3 Credits

Theories and applied technologies for production and conversion of biomass into energy and co-products.

ABE 885: Biomass Harvesting and Logistics

3 Credits

Biomass harvesting and handling scenarios and relevant cost analysis and systematic considerations.

Prerequisite: A B E884

ABE 888: Conversion Technologies for Bioenergy Production

3 Credits

Applications of chemical, biochemical, thermochemical, and bioprocess technologies for the production of bioenergy.