

BIORENEWABLE SYSTEMS (BRS)

BRS 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: ABE 500

BRS 501: Biobased Polymers

3 Credits

The chemistry, structure-property relationships, and industrial applications of biobased polymers from plant and agricultural feedstocks.

BRS 502: Human Behavior and ethics in Management and Technology

3 Credits

Ethical leadership continues to be a key issue in our society and is a topic of growing interest to the public and researchers alike. Our world more than ever needs ethical leadership to address critical sociotechnological problems such as climate change, sustainable energy and materials, quality food and water, population growth, prejudice, and global conflict to name just a few. This course will provide students with an improved mechanistic understanding of basic human behavior foundational to ethical leadership and decision making. Specifically, a series of important psychological studies will be examined which provide insights into human needs, personality, individual and social behavior, and leader-follower dynamics which are needed to identify new approaches for developing and managing leadership. Students will explore the literature themselves and share their findings and insights with the larger group. Students will apply what they learn by proposing new management processes for ensuring ethical leadership and decision making and share those with their peers.

BRS 504: Biorenewable Systems Analysis

3 Credits

This course will introduce students to the major foundational concepts in the field of Sustainability and cover in-depth technoeconomic (TEA)

and life cycle analysis (LCA), the two predominant tools utilized to quantitatively evaluate economic, social, and environmental sustainability of products, processes or services. While the course emphasizes quantitative methods, readings and discussions will also include social and ethical aspects of sustainability, which are critically important and will help to frame analyses with these considerations in mind. Social considerations will include issues of race, equity and justice. TEA is a methodology for the assessment and comparison of the technical and economic feasibility of emerging technologies. LCA is a systematic and holistic approach that enables designers and planners to identify the most impactful stages of a supply chain so that we might strategically intervene to improve the system. Emphasis on the unique challenges of bio-based systems will be highlighted throughout. Students will also develop estimation, data verification skills, how to consider uncertainty in analysis, and learn how materials and energy flows lead to impacts to ecological and human systems. This course will facilitate development of critical thinking skills to holistically consider systems to develop the human, materials and energy transactions that can lead to more renewable and sustainable systems.

BRS 511: Structural BioComposites

3 Credits

Manufacture and practices related to the production of engineered biocomposites processed from lignocellulosic materials.

BRS 550: Applied Bioproducts Marketing

3 Credits

Bioproduct marketing applications for solid and engineered wood products and biorefinery value chain output including environmental services, energy, fuels, and co-products.

BRS 551: Sustainable Business Strategies

2 Credits

Coverage of business strategies that relate to sustainability and environmental issues.

BRS 568: Applied Biomanufacturing Laboratory

3 Credits

In partnership with the Center of Excellence in Industrial Biotechnology, this hands-on course takes place in the state-of-the-art CSL Behring Fermentation Facility. Students gain experience in the principles and methods used to produce bio-based products. Lab activities span upstream to downstream processing with exposure to fermentation processes in bioreactors, cell lysis, filtration, and chromatography.

BRS 590: Colloquium

1-6 Credits/Maximum of 12

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

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BRS 595: Internship

1-9 Credits/Maximum of 12

Supervised, research-oriented, off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.

BRS 596: Individual Studies

1-9 Credits

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

BRS 597: Special Topics

1-9 Credits/Maximum of 15

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 semester.

BRS 600: Thesis Research

1-15 Credits/Maximum of 999

No description.

BRS 601: Ph.D. Dissertation Full-Time

0 Credits/Maximum of 999

No description.

BRS 602: Supervised Experiences in College Teaching

1-3 Credits/Maximum of 6

Provides an opportunity for supervised and graded teaching experience in undergraduate biorenewable systems courses.

BRS 610: Thesis Research Off Campus

1-15 Credits/Maximum of 999

No description.