BIORESOURCE AND AGRICULTURAL ENGINEERING (BRAE)

undefined

BRAE Courses

BRAE 1128 Careers in BioResource and Agricultural Engineering (2 units)
Term Typically Offered: F

Introduction to careers in bioresources and agriculture. Professional Engineer registration process. Use of essential computer software for professional communication. Engineering project management and design fundamentals. Laboratory and fabrication skills and safety. 1 lecture, 1 laboratory. Formerly BRAE 128.

BRAE 1141 Agricultural Machinery Safety (2 units)
Term Typically Offered: F, SP

Evaluation of safe tractor and equipment operation. Supervised field operation emphasizing the safe and efficient performance of modern farm and utility-industrial equipment. 1 lecture, 1 laboratory. Formerly BRAE 141.

BRAE 1150 Design Graphics and CAD for Agricultural Engineering (2 units)
Term Typically Offered: F, SP

Visual communication in engineering design and problem solving. Principles of freehand sketching, and computer-aided-drafting. 2D projections including automatic dimensioning and hatching. Land grading design, using 3D drawing software. Software based 3D solid modeling. 2 laboratories. Formerly BRAE 150.

BRAE 1239 Engineering Surveying (3 units)
Term Typically Offered: F, SP
Prerequisite: MATH 119, MATH 1007, or appropriate math placement.

Field measurement using levels, robotic stations, real-time kinematic positioning (RTK) receivers, data collectors. Leveling, profiles, traverses, traverse adjustment, triangulation, earthwork volumes, curve alignment computations. Topographic surveys and mapping, building layout, road design, geodetic survey, aerial mapping, geographic information system (GIS), and remote sensing. 2 lectures, 1 laboratory. Formerly BRAE 239.

BRAE 2142 Agricultural Power and Machinery Management (3 units)
Term Typically Offered: SP
Prerequisite: MATH 221 or MATH 1267.

Evaluation of agricultural machinery and tractor power performance. Equipment includes primary and secondary tillage tools, grain drills, row crop planters, sprayers, and crop harvesters. Emphasis on management, selection, cost analysis using computers, and efficient operation of agricultural machinery. 2 lectures, 1 laboratory. Formerly BRAE 142.

BRAE 2200 Special Problems for Undergraduates (1-4 units)
Term Typically Offered: F, SP
Prerequisite: Consent of department head.

Individual investigation, research, studies or surveys of selected problems. Repeatable up to 8 units. Formerly BRAE 200.

BRAE 2203 Systems Management I (4 units)
Term Typically Offered: F
Corequisite: MATH 221 or MATH 1267.

Introduction to systems and technical management with application in agricultural business settings including logistics, reliability, system behavior, and systematic decision making. Investigating interrelationships between sub-components in an overall system. Problem-solving algorithms, network analysis, project planning techniques, and optimization. 3 lectures, 1 laboratory. Formerly BRAE 203.

BRAE 2216 Fundamentals of Electricity (4 units)
Term Typically Offered: SP
Prerequisite: BRAE 128 or BRAE 1128; MATH 143 or MATH 1262; and PHYS 141 or PHYS 1141.

Application of electricity in BioResource and Agricultural Engineering. Electrical circuits and electronics, electrical measurements, RLC circuit fundamentals, electrical system planning, motors, wiring materials, electrical safety, and code regulations. 3 lectures, 1 laboratory. Formerly BRAE 216.

BRAE 2220 Introduction to Biological Systems (4 units)
Term Typically Offered: SP
2026-28 or later catalog: GE Area 5B
2026-28 or later catalog: GE Area 5C
2020-26 catalogs: GE Area B2
2020-26 catalogs: GE Area B3
Sustainability Focused
Prerequisite: CHEM 125 or CHEM 1122.

Systems approach to introductory life science that focuses on patterns and cycles in biology. Introductory modeling and quantitative measurement of life science parameters. Emphasis on the interaction between organisms and their environment. Course may be offered in classroom-based or hybrid format. 3 lectures, 1 laboratory. Fulfills GE Areas 5B and 5C (GE Areas B2 and B3 for students on the 2020-26 catalogs). Formerly BRAE 220.

BRAE 2221 Engineering Mechanics with Agricultural Applications I (4 units)
Term Typically Offered: SP
Prerequisite: MATH 143 or MATH 1262; and PHYS 141 or PHYS 1141.

Statics and mechanics of materials with emphasis on agricultural and bioresource applications. Vectors, forces, and moments. Point and rigid body statics. Structural analysis. Mechanical properties of materials. Internal loads, stress, and strain under axial and torsional external loads. Course may be offered in classroom-based or hybrid format. 3 lectures, 1 laboratory.

BRAE 2222 Engineering Mechanics with Agricultural Applications II (4 units)
Term Typically Offered: F
Prerequisite: BRAE 2221; and MATH 241 or MATH 2263.

Mechanics of materials, dynamics, and integrable and linear constant-coefficient differential equations with emphasis on agricultural and bioresource applications. Bending, combined loads, stress transformations, and material failure. Deflection and buckling. Kinematics/dynamics of point masses/rigid bodies. Impulse and energy methods. Course may be offered in classroom-based or hybrid format. 3 lectures, 1 laboratory.

BRAE 2236 Principles of Irrigation (4 units)
Term Typically Offered: F
Prerequisite: MATH 141 or MATH 1261.

Introduction to basic principles of irrigation including the types of systems, water rights, irrigation efficiency, and soil, plant, and water relationships. Field procedures for evaluating distribution uniformity of different irrigation methods and water measurement. Operation and design of pumps. Field trip required. 3 lectures, 1 laboratory. Formerly BRAE 236.

BRAE 2237 Introduction to Engineering Surveying (2 units)
Term Typically Offered: F, SP
Prerequisite: One of the following: MATH 119, MATH 141, MATH 161, MATH 221, MATH 1007, MATH 1267, MATH 1261, or appropriate math placement.

Introduction to field measurement using automatic levels, total stations, robotic stations, global navigation satellite system (GNSS) real-time kinematic positioning (RTK) receivers, and field data collectors. Field procedures for differential and profile leveling, directional measurement, traversing, and construction surveying. Computations for direction, elevation, and earthwork volume. 1 lecture, 1 laboratory. Formerly BRAE 237.

BRAE 2270 Special Topics (1-4 units)
Term Typically Offered: TBD
Prerequisite: Consent of instructor.

Directed group study of special topics. The Class Schedule will list topic selected. Repeatable up to 8 units. 1 to 4 lectures. Formerly BRAE 270.

BRAE 3234 Equipment Engineering I (4 units)
Term Typically Offered: SP
Prerequisite: BRAE 150 or BRAE 1150; and ME 212 or BRAE 2222.

Introduction to elements used in the mechanical transmission of power and force in agricultural systems. Power transmission using v-belts, roller chains, gear and shaft drives, and hydraulic actuators. Linear and nonlinear actuation devices including linkages, cams, and hydraulic/pneumatic cylinders. 3 lectures, 1 laboratory. Replaced BRAE 234.

BRAE 3301 Hydraulic and Mechanical Power Systems (3 units)
Term Typically Offered: F
Prerequisite: BRAE 150 or BRAE 1150; and one of the following: PHYS 121, PHYS 141, PHYS 1121, or PHYS 1141.

Introduction to mechanical and hydraulic power transmission in agricultural systems for non-engineers. Power transmission using v-belts, roller chains, gear and shaft drives, hydraulic actuators, and hydraulic valves. Application of hydraulic components, mechanical power equipment, and standard hydraulic circuit design. 2 lectures, 1 laboratory. Formerly BRAE 301.

BRAE 3312 Hydraulics (3 units)
Term Typically Offered: F
Prerequisite: ME 211 or BRAE 2221; and one of the following: PHYS 123, PHYS 143, PHYS 1123, or PHYS 1143.

Fluid properties and characteristics under static and dynamic conditions. Water hydraulics in pipelines and open channels. Conservation equations, Bernoulli equations, flow resistance equations, buoyancy force, and hydraulic grade lines. 2 lectures, 1 laboratory. Formerly BRAE 312.

BRAE 3317 Systems Management II (4 units)
Term Typically Offered: SP
Prerequisite: Completion of GE Area 1B with a grade of C- or better (GE Area A3 for the 2020-26 catalogs); AGB 260 or AGB 2260; and BRAE 203 or BRAE 2203.

Project management of agricultural systems. Emphasis placed on a team approach to problem solution. Project leadership, organization, communication, needs assessment, feasibility studies, cost analysis, decision making, solution implementation, and evaluation. 3 lectures, 1 laboratory. Formerly BRAE 418.

BRAE 3320 Bioresource Engineering (3 units)
Term Typically Offered: SP
Prerequisite: BRAE 220 or BRAE 2220; CHEM 125 or CHEM 1122; and PHYS 143 or PHYS 1143.

Theory and applications of bioprocess technology in biological and agricultural systems. Engineering properties of biological materials and organisms. Basic unit operations, biological principles and mass balances as applied to waste treatment technology. Special requirements of agricultural and biological processes. Field trip required. 2 lectures, 1 laboratory. Formerly BRAE 320.

BRAE 3332 Environmental Controls for Agricultural Structures (3 units)
Term Typically Offered: F
Prerequisite: BRAE 216 or BRAE 2216; and CHEM 125 or CHEM 1122.

Design of internal environments to meet the needs of commodities, animals, and plants. Thermodynamic and psychrometric principles for agricultural structures. Heat transfer, insulation, and refrigeration. Sensing, monitoring, and controlling environmental factors affecting crop storage structures and animal housing. 2 lectures, 1 laboratory. Formerly BRAE 332.

BRAE 3335 Internal Combustion Engines (3 units)
Term Typically Offered: TBD
Prerequisite: Junior standing.

Principles and theory of operation of internal combustion engines. Diagnosis and repair of small engines, including gasoline and diesel engines. Economics of operation, use, and repair. Power analysis and application. 2 lectures, 1 laboratory. Formerly BRAE 335.

BRAE 3340 Irrigation Water Management (3 units)
Term Typically Offered: F, SP
2026-28 or later: Upper-Div GE Area 2/5
2020-26 catalogs: Upper-Div GE Area B
Prerequisite: Junior standing; completion of GE Area 1 with grades of C- or better (GE Area A for the 2020-26 catalogs); and completion of GE Area 2 with a grade of C- or better (GE Area B4 for the 2020-26 catalogs).

California water supply and budget; water rights and issues. Local, state and federal water institutions. Water measurement; basic hydraulics; irrigation systems; distribution uniformity and efficiency. Soil-plant-water relationships; soil moisture measurement; evapotranspiration; irrigation schedules; practical constraints affecting scheduling; salinity and drainage. Course may be offered in classroom-based, online, or hybrid format. 2 lectures, 1 laboratory. Fulfills GE Areas Upper-Division 2 or Upper-Division 5 (GE Area Upper-Division B for students on the 2020-26 catalogs). Formerly BRAE 340.

BRAE 3343 Mechanical Systems Analysis (4 units)
Term Typically Offered: SP
Prerequisite: PHYS 121 or PHYS 1121.

Physical properties of structural materials and their measurement. Strength of materials, material deformation, shape and size classification. Use of statics to make original calculations, plans, sketches, graphics, drawings, schemes, and layouts for the fabrication and construction of machines. 3 lectures, 1 laboratory. Formerly BRAE 343.

BRAE 3344 Fabrication Systems (2 units)
Term Typically Offered: SP
Prerequisite: BRAE 2222, BRAE 343, or BRAE 3343.

Fabrication systems including cutting, sawing, shearing, bending, welding, grinding, cleaning, and painting. Proper safety procedures. Experimental projects to include team design and construction, presentation, organization, and evaluation. 1 lecture, 1 laboratory. Formerly BRAE 344.

BRAE 3345 Photogrammetry and Remote Sensing with GIS Applications (3 units)
Term Typically Offered: F
Prerequisite: MATH 118 or MATH 1006; and NR 218 or NR 2218.

Concepts of photogrammetry and remote sensing. Object recognition, stereoscopic viewing, elevation determination, and scale. Techniques for collecting, processing, and interpreting remote sensing data. Digital image analysis techniques such as image enhancement, change detection, unsupervised and supervised classifications. 2 lectures, 1 laboratory. Formerly BRAE 345.

BRAE 3348 Energy for a Sustainable Society (3 units)
Term Typically Offered: F, SP
2026-28 or later: Upper-Div GE Area 2/5
2020-26 catalogs: Upper-Div GE Area B
Sustainability Focused
Prerequisite: Junior standing; completion of GE Area 1 with grades of C- or better (GE Area A for the 2020-26 catalogs); and completion of GE Area 2 with a grade of C- or better (GE Area B4 for the 2020-26 catalogs).

Transition from fossil fuels to renewable energy sources including hydro, biomass, solar, wind, and energy conservation. Environmental, economic, and political consequences of a renewable energy-based sustainable society. Course may be offered in classroom-based or hybrid format. 2 lectures, 1 activity. Fulfills GE Areas Upper-Division 2 or Upper-Division 5 (GE Area Upper-Division B for students on the 2020-26 catalogs). Formerly BRAE 348.

BRAE 3349 Water for a Sustainable Society (3 units)
Term Typically Offered: TBD
2026-28 or later: Upper-Div GE Area 4
2020-26 catalogs: Upper-Div GE Area D
Sustainability Focused
Prerequisite: Junior standing; completion of GE Area 1 with grades of C- or better (GE Area A for the 2020-26 catalogs); completion of GE Area 2 with a grade of C- or better (GE Area B4 for the 2020-26 catalogs); and completion of one lower-division course in GE Area 4 (GE Areas D1 or D2 for the 2020-26 catalogs).

Historical, political, economic, socio-technical, and cultural dimensions of water sustainability. Overview of complex systems with an emphasis on individual choices and their impact on water sustainability. Exploration of core sustainability concepts, practices, barriers, and goals related to water resources. Course offered online only. 3 lectures. Crosslisted as BRAE/NR 3349. Fulfills GE Upper-Division 4 (GE Area Upper-Division D for students on the 2020-26 catalogs). Formerly BRAE/NR 349.

BRAE 4302 Servo Hydraulics (3 units)
Term Typically Offered: TBD
Prerequisite: One of the following: BRAE 234, BRAE 3234, BRAE 301, or BRAE 3301.

Application of microcomputers and programmable logic controllers to hydraulic, pneumatic and mechanical systems. Theory, instrumentation and sensors used in process and control systems used in agricultural equipment. 2 lectures, 1 laboratory. Formerly BRAE 302.

BRAE 4400 Special Problems (1-4 units)
Term Typically Offered: F, SP
Prerequisite: Consent of department head.

Individual investigation, research, studies, or surveys of special problems in agriculture. Repeatable up to 8 units. Formerly BRAE 400.

BRAE 4403 Agricultural Engineering Ethics, Economics, and Optimization (3 units)
Term Typically Offered: SP
Prerequisite: One of the following: ECON 201, ECON 2001, ECON 222, or ECON 2040; and MATH 241 or MATH 2263. Corequisite: STAT 312 or STAT 3210.

Ethical and economic considerations in agricultural engineering. Mathematical strategies for making rational choices. Engineering codes of conduct and the resolution of ethical dilemmas. Engineering economic analysis considering interest and inflation. Constrained optimization using linear and nonlinear programming. Course may be offered in classroom-based or hybrid format. 2 lectures, 1 laboratory. Formerly BRAE 403.

BRAE 4414 Irrigation Engineering (3 units)
Term Typically Offered: SP
Prerequisite: Graduate standing; or BRAE 312 or BRAE 3312 with a grade of C- or better, and one of the following: BRAE 236, BRAE 2236, BRAE 340, or BRAE 3340.

Design of on-farm irrigation systems. Micro, surface, and sprinkler irrigation systems. Canals and pumps. Economic and strategies of pipe design and pipeline protection. Field trip required. 3 lectures. Formerly BRAE 414.

BRAE 4419 Systems Management III (3 units)
Term Typically Offered: F
Prerequisite: BRAE 418 or BRAE 3317.

Process management of agricultural systems. Emphasis placed on a team approach to problem solution. Case studies and student projects used to explore the following topics: process capacity, layout, supply-chain, inventory, lean system, process assessment and improvement. Field trip may be required. 2 lectures, 1 laboratory. Formerly BRAE 419.

BRAE 4422 Equipment Engineering II (3 units)
Term Typically Offered: F
Prerequisite: BRAE 234 or BRAE 3234.

Selection, analysis, design, and use of specialized agricultural components and equipment. Finite element analysis, steel beams and columns, welds, fasteners, ball bearings, gears, energy storage, electric motors, and mobility systems. Course may be offered in classroom-based or hybrid format. 2 lectures, 1 laboratory. Formerly BRAE 422.

BRAE 4425 Agricultural Mechatronics (5 units)
Term Typically Offered: F
Prerequisite: Junior standing; one of the following: MATH 119, MATH 1007, MATH 141, MATH 1261, MATH 221, or MATH 1267; and one of the following: PHYS 121, PHYS 1121, PHYS 141, or PHYS 1141.

Computer-activated controls as applied to agricultural machinery, processing, and irrigation industries. Encompassing control logic to evaluate the stability behavior of systems of computer interfacing, data input, and control output. Programmable logic controllers, sensors, and communications for agricultural mechanization. 4 lectures, 1 laboratory. Formerly BRAE 425.

BRAE 4428 Agricultural Robotics and Automation (4 units)
Term Typically Offered: SP
Prerequisite: BRAE 216 or BRAE 2216.

Agricultural applications of signal processing, control theories, machine vision and robot basics for agricultural production and processing. Approaches and constraints related to agricultural automation and the use of robotics in field applications. Engineering approach to problem-solving and experimental data analysis. Field trip required. 3 lectures, 1 laboratory. Formerly BRAE 428.

BRAE 4432 Agricultural Buildings (4 units)
Term Typically Offered: SP
Prerequisite: BRAE 343 or BRAE 3343; and PHYS 121 or PHYS 1121.

Planning of facilities required in production systems. Materials and processes used in construction of agricultural structures. Environmental factors affecting crop storage structures and animal housing. Design of structural environments to meet needs of commodities, animals, and plants. Economics and functionality of various building designs and construction materials. Field trip required. 3 lectures, 1 laboratory. Formerly BRAE 432.

BRAE 4433 Agricultural Structures Design (4 units)
Term Typically Offered: F
Prerequisite: BRAE 239 or BRAE 1239; and CE 204 or BRAE 2222.

Structural analysis and design of agricultural structures and the materials and processes used in construction. Emphasis on use of wood, metals, and reinforced concrete. 3 lectures, 1 laboratory. Formerly BRAE 433.

BRAE 4438 Aquaculture (4 units)
Term Typically Offered: F
Prerequisite: One of the following: BIO 263, BIO 2253, BRAE 220, BRAE 2220, MSCI 300, or MSCI 3300.

Propagation and rearing of fishes, invertebrates, and algae from marine, freshwater, and estuarine habitats. Global perspectives including aquaculture development and current status in developed and developing countries for food production. Current culture methodologies and examination of system design constraints. 3 lectures, 1 laboratory. Crosslisted as BRAE/MSCI 4438. Formerly MSCI 438.

BRAE 4440 Agricultural Irrigation Systems (4 units)
Term Typically Offered: SP
Prerequisite: Graduate standing, BRAE 340, or BRAE 3340.

On-farm irrigation system evaluation and management. Drip, micro-spray, furrow, border strip, and sprinkler systems. Filtration, emitters, chemical injection, agronomic constraints, and scheduling. Emphasis on irrigation efficiency, uniformity, and pumping costs. Field trip required. Not open to BioResource and Agricultural Engineering majors. 3 lectures, 1 laboratory. Formerly BRAE 440.

BRAE 4447 Advanced Surveying with GIS Applications (3 units)
Term Typically Offered: SP
Prerequisite: One of the following: BRAE 237, BRAE 239, BRAE 1239, or BRAE 2237.

Field skills in precise mapping, high order control and terrestrial imagery. Computer-aided design (CAD) mapping and design. Work with large datasets on regional surface models. Collect, manipulate data for Geographic Information Systems (GIS). Basics of boundary law and limitations of using land boundaries in GIS. 2 lectures, 1 laboratory. Formerly BRAE 447.

BRAE 4448 Bioconversion (3 units)
Term Typically Offered: TBD
Sustainability Focused
Prerequisite: MATH 118 or MATH 1006.

Biological, thermal and physical techniques for converting biomass into useful energy forms for agriculture and industry. Experiments with anaerobic digestion of animal wastes into methane, ethanol fermentation of grains and composting of agricultural residues. Technical and economic feasibility of biofuels. Field trip required. 2 lectures, 1 laboratory. Formerly BRAE 448.

BRAE 4460 Senior Project I (1 unit)
Term Typically Offered: F
Prerequisite: Senior standing and completion of GE Area 1B with a grade of C- or better (GE Area A3 for the 2020-26 catalogs).

Selection and organization of senior project. Involves time management, research techniques, budgeting and project presentation. Documentation of multidisciplinary team experience. 1 laboratory. Formerly BRAE 460.

BRAE 4461 Senior Project II (2 units)
Term Typically Offered: SP
Prerequisite: BRAE 460 or BRAE 4460.

Solution of an engineering or systems management problem in agriculture. May involve research methodology, problem statement, analysis, synthesis, project design, construction, and evaluation. Fundamentals of Engineering (FE) exam preparation. 2 laboratories. Formerly BRAE 462.

BRAE 4470 Special Advanced Topics (1-3 units)
Term Typically Offered: TBD
Prerequisite: Consent of instructor.

Directed group study of special topics for advanced students. The Class Schedule will list topic selected. Repeatable up to 6 units. 1 to 3 lectures. Formerly BRAE 470.

BRAE 4471 Special Advanced Laboratory (1-3 units)
Term Typically Offered: TBD
Prerequisite: Consent of instructor.

Directed group laboratory study of special topics for advanced students. The Class Schedule will list topic selected. Repeatable up to 6 units. 1 to 3 laboratories. Formerly BRAE 471.

BRAE 5405 Chemigation (1 unit)
Term Typically Offered: SP
Prerequisite: One of the following: BRAE 236, BRAE 2236, BRAE 340, BRAE 3340, or graduate standing.

Fertilizer and chemical injection through irrigation systems. Hardware, fertilizer compounds, and distribution uniformity. Matching chemicals and equipment to specific irrigation methods. Safety. Course offered online only. 1 activity. Formerly BRAE 405.

BRAE 5435 Hydrology and Drainage (3 units)
Term Typically Offered: F
Prerequisite: One of the following: BRAE 312, BRAE 3312, BRAE 340, BRAE 3340, or graduate standing.

Principles of engineering hydrology and porous media flow. Flow nets, wells, and groundwater, design of simple surface and sub-surface drainage systems. 2 lectures, 1 laboratory. Formerly BRAE 435.

BRAE 5436 Food and Agriculture Process Water Engineering (3 units)
Term Typically Offered: TBD
Prerequisite: Graduate standing; or CHEM 125 or CHEM 1122. Recommended: One of the following: BIO 111, BIO 1111, BIO 161, BIO 1151, BOT 121, BOT 1121, BRAE 220, BRAE 2220, MCRO 221, or MCRO 2221.

Theory and design of facilities for physical and chemical treatment of water used in agricultural practices to sanitize crops as they are harvested, and water used while processing the commodities. Design of chemical and biological reactors. Field trip required. 2 lectures, 1 laboratory. Formerly BRAE 436.

BRAE 5500 Individual Study (1-4 units)
Term Typically Offered: F, SP
Prerequisite: Consent of instructor.

Advanced study planned and completed under the direction of a member of the department faculty. Open only to graduate students who have demonstrated ability to do independent work. Repeatable up to 6 units. Formerly BRAE 500.

BRAE 5532 Water Pumps and Wells (3 units)
Term Typically Offered: SP
Prerequisite: One of the following: BRAE 312, BRAE 3312, BRAE 340, BRAE 3340, CE/ENVE 3336, ME 341, ME 3341, or graduate standing.

Water well drilling, design, and development. Pump characteristics and system head. Series and parallel operation. Pump intake and sump design. Variable speed electric drives and engines. Pump testing. Supervisory Control and Data Acquisition (SCADA) for pumping systems. Field trip required. 2 lectures, 1 laboratory. Formerly BRAE 532.

BRAE 5533 Irrigation Project Design (3 units)
Term Typically Offered: SP
Prerequisite: One of the following: BRAE 312, BRAE 3312, BRAE 340, BRAE 3340, CE 3336, ME 341, ME 3341, or graduate standing.

Advanced open channel and pipeline controls for unsteady flow. Engineering solutions for modernizing irrigation projects, flow measurement, advanced control structure design, reservoir design, and Supervisory Control and Data Acquisition (SCADA) systems. Defining and quantification of water delivery service to customers. Field trip required. 2 lectures, 1 laboratory. Formerly BRAE 533.

BRAE 5570 Special Advanced Topics (1-4 units)
Term Typically Offered: TBD
Prerequisite: Graduate standing and consent of instructor.

Directed group study of special topics for advanced students. The Class Schedule will list topic selected. Repeatable up to 9 units. 1 to 4 seminars. Formerly BRAE 570.

BRAE 5571 Special Advanced Laboratory (1-4 units)
Term Typically Offered: TBD
Prerequisite: Graduate standing and consent of instructor.

Directed group laboratory study of special topics for advanced students. The Class Schedule will list topic selected. Repeatable up to 8 units. 1 to 4 laboratories. Formerly BRAE 571.

BRAE 5599 Thesis (1-6 units)
Term Typically Offered: F, SP
Prerequisite: Graduate standing and consent of instructor.

Systematic research of a significant problem in bioresource and agricultural engineering. Thesis will include problem identification, significance, methods, data analysis, and conclusion. Repeatable up to 6 units. Formerly BRAE 599.