

Biological and Agricultural Engineering

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Note: All 300, 400, and 500-level biological and agricultural engineering courses require a working knowledge of computers, structured programming, electronic spreadsheets, and word processing.

BAE 142 Engineering for Living Systems (2 cr)

Introduction to engineering principles used to solve agricultural and biological systems problems, including use of computers. One lec and one 3-hr lab a wk; two half-day field trips.

BAE 242 Engineering Analysis and Design (2 cr)

Methods of analyzing and solving engineering problems and introduction to elements of design; use of computers in engineering problem solving. Recommended Preparation: computer science elective in a programming language.

Prereq: Math 170

Coreq: Math 175

BAE 299 (s) Directed Study (cr arr)

BAE 355 Fundamentals of Hydrologic Engineering (3 cr)

See CE 325.

BAE 356 Hydrologic Measurement Techniques (1 cr)

See CE 326.

BAE ID&WS372 Agricultural Power and Machines (3 cr) WSU BSysE 362

Performance, operation, and testing of agricultural power units and machinery; functional requirements, force analysis, power transmission, safety, and economics. Two lec and three hrs of lab a wk; one 1-day field trip.

BAE WS386 Mechanics of Biomaterials (4 cr) WSU BSysE 320

Composition of biological materials, mechanical and thermal properties, chemical and biological changes. Two lec and one 3-hr lab a wk. Recommended Preparation: Engr 335 and 350.

BAE 398 (s) Engineering Cooperative Internship (cr arr)

Supervised internship in professional engineering settings, integrating academic study with work experience; details of the co-op to be arranged with supervising professor before the start of the co-op; requires written report. Graded P/F. Cannot be used for technical elective.

Prereq: Permission

BAE 404 (s) Special Topics (cr arr)

BAE ID-J432/ID-J532 Bioreactor Theory and Design for Waste Treatment (3 cr)

BAE 532 same as EnvE 544. Theory of biological waste treatment as applied to wastewaters, including reaction kinetics, reactor theory and design, reaction stoichiometry, microbiology, gas transfer theory, suspended growth and attached growth process theory and design, and separation of biological solids. Graduate credit requires additional design project. One field trip.

Prereq: Chem 112, Math 310, and Biol 115 or MMBB 250, 255

BAE J433/J533 Bioremediation (3 cr)

BAE 533 same as EnvE 533. Theory and practice of bioremediation as applied to toxic and hazardous wastes, including reaction kinetics, reaction stoichiometry, microbiology, and design of ex- and in-situ processes. Graduate credit requires additional design project. One-two field trips.

Prereq: Biol 115 and Math 170, or Permission

BAE ID&WS-J441/ID&WS-J541 Instrumentation and Measurements (3 cr) WSU BSysE 541

Sensing elements, signal conditioning, data output and control. Additional projects/assignments reqd for grad cr. Two lec and one 3-hr lab a wk. Recommended Preparation: BAE 462.

BAE 450 Environmental Hydrology (3 cr)

Carries no credit after BAE 355 or CE 325. The objective of this course is to provide a comprehensive understanding of the hydrologic processes associated with the environmental processes. Includes components of the hydrologic cycle, analysis of precipitation and run off, evapotranspiration, routing, peak flow, infiltration, soil and water relationships, snowmelt, and frequency analysis. (Spring only)

Prereq: Math 170

BAE ID451 Engineering Hydrology (3 cr) WSU BSysE 451

See CE 421.

BAE ID&WS-J452/ID&WS-J552 Environmental Water Quality (3 cr) WSU BSysE 452

Engineering design to monitor, evaluate, and minimize non-point pollution from agriculture, environmentally acceptable disposal of wastes, bioremediation. Graduate credit requires an additional project and report. Two lec and one 3-hr lab a wk.

Prereq: Chem 112 and Soil 205 or MMBB 250, and BAE 355 or BAE 450

BAE 458 Open Channel Hydraulics (3 cr)

Same as CE 428. Hydraulics of uniform and varied flow in open channels with fixed and movable beds. Recommended Preparation: CE 322.

BAE ID&WS459 Irrigation System Design (3 cr) WSU BSysE 453

Crop water requirements, irrigation scheduling and water management, selection and design of irrigation systems, pump selection. Two lec and one 3-hr lab a wk; one 1-day field trip.

Prereq: Engr 335

BAE ID&WS461 Bioprocess Engineering (3 cr) WSU BSysE 461

Carries 2 credits after ME 345. Processing principles and transport processes applied to the analysis and design of handling, processing, and producing of biomaterials and bioprocesses. Two lec and one 3-hr lab a wk. (Spring only, alt/yr)

Prereq: Math 310, Engr 320 and 335, or Permission

BAE ID&WS462 Electric Power and Controls (3 cr) WSU BSysE 380

Design, selection, and use of electrical equipment and electric power systems for application to biological systems; design and use of electrical, electronic, and other feedback control systems for use with biological systems. Two lec and one 3-hr lab a wk.

Prereq: Engr 240

Coreq: Math 310

BAE WS-J465/WS-J565 Surface Hydrologic Processes and Modeling (3 cr) WSU BSysE 456/556

BAE 478 Engineering Design I (3 cr)

May be used as core credit in J-3-d. Intro to design process, CAD/CAM facility, product liability, and project scheduling; formulation of a design problem.

Prereq: Senior standing or Permission

BAE 479 Engineering Design II (3 cr)

May be used as core credit in J-3-d. Individual or team design of an agricultural related problem; incl synthesis, analysis, construction, and testing; final report reqd. Two 3-hr labs a wk. Recommended Preparation: BAE 478.

BAE WS483 Food Separation Processes Design (3 cr) WSU BSysE 483

BAE 491 Senior Seminar (1 cr)

Professional aspects of the field, employment opportunities and preparation of occupational inventories. Graded P/F.

Prereq: Senior standing.

BAE 499 (s) Directed Study (cr arr)

BAE 500 Master's Research and Thesis (cr arr)

BAE 501 (s) Seminar (cr arr)

Graded P/F.

Prereq: Permission

BAE 502 (s) Directed Study (cr arr)

BAE ID532 Bioreactor Theory and Design for Waste Treatment (3 cr)

See BAE J432/J532.

BAE 533 Bioremediation (3 cr)

See BAE J433/J533.

BAE 534 Applied Bioremediation (3 cr)

Application of theory and design learned in prerequisite BAE 433/533 including conducting treatability studies, transportation and fate modeling in the subsurface, and hydrologic testing. Students required to complete laboratory, numerical modeling, and field-testing modules in addition to a subsurface modeling project.

Prereq: BAE 433/533

BAE ID&WS541 Instrumentation and Measurements (3 cr)

See BAE J441/J541.

BAE 550 Natural Channel Flow (3 cr)

Same as CE 529. Hydraulics of nonuniform flow in irregular channels, unsteady flow, and flow routing.

BAE ID551 Advanced Hydrology (3 cr) WSU BSysE 550

Principles of the hydrologic cycle including precipitation, lower atmosphere, evaporation, fluid mechanics of free surface flow, overland flow, stream flow routing, water transport in porous media, infiltration, groundwater outflow and base flow, stream flow generation, and elements of frequency analysis in hydrology.

Prereq: BAE 335; or BAE 450 and Math 310; or Permission

BAE ID&WS552 Environmental Water Quality (3 cr)

See BAE J452/J552.

BAE ID558 Fluid Mechanics of Porous Materials (3 cr) WSU BSysE 558

Statics and dynamics of multifold systems in porous materials; properties of porous materials; steady and unsteady flow.

BAE WS565 Surface Hydrologic Processes and Modeling (3 cr) WSU BSysE 556

See BAE J465/J565.

BAE WS582 Food Process Engineering Design (3 cr) WSU BSysE 582 or FSHN 582

See FS J482/J582.

BAE 599 (s) Non-thesis Master's Research (cr arr)

Research not directly related to a thesis or dissertation.

Prereq: Permission

BAE 600 Doctoral Research and Dissertation (cr arr)