

AGRICULTURAL AND BIOLOGICAL ENGINEERING

Not all courses are offered every semester. Refer to the schedule of courses for each term's specific offerings.

More Info (<http://registrar.ufl.edu/soc/>)

Courses at the University of Florida, with the exception of specific foreign language courses and courses in the online Master of Arts in Mass Communication program, are taught in English.

Department Information

The Department of Agricultural and Biological Engineering is founded on developing, teaching, and applying engineering principles to improve and sustain agricultural and biological systems for current and future generations.

Website (<https://abe.ufl.edu/>)

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Map (<http://campusmap.ufl.edu/#/index/0474>)

Curriculum

- Agricultural Operations Management
- Biological Engineering
- Combination Degrees
- Packaging Engineering Certificate
- Packaging Science Minor
- Precision Agriculture Minor

Courses

ABE 2012C Introduction to Biological Engineering 3 Credits

Grading Scheme: Letter Grade

Introduces the process of design along with approaches to solving engineering problems, manipulations and presentations of engineering data and applied engineering concepts. (WR)

Prerequisite: MAC 2311.

Attributes: Satisfies 2000 Words of Writing Requirement

ABE 2062 Biology for Engineers 3 Credits

Grading Scheme: Letter Grade

Principles and engineering applications of biology. Principles and applications of biochemistry, genetics, microbial systems, animal systems, ecological systems and global systems. (B) (WR)

Attributes: General Education - Biological Science, Satisfies 6000 Words of Writing Requirement

ABE 3000C Applications in Biological Engineering 3 Credits

Grading Scheme: Letter Grade

Overview of the research and applications of biological engineering, such as bioprocessing, biotechnology, transport processes, biosensors, bioremediation, biological materials and biomedicine.

Prerequisite: BSC 2010 or equivalent.

ABE 3212C Land and Water Resources Engineering 4 Credits

Grading Scheme: Letter Grade

Introduces hydrology, flow through porous media, flood routing, grade control structures and erosion control.

Prerequisite: ENV 3040C and MAP 2302.

Corequisite: CWR 3201 or EGN 3353C.

ABE 3612C Heat and Mass Transfer in Biological Systems 4 Credits

Grading Scheme: Letter Grade

Transport phenomena, steady and unsteady-state heat conduction, radiation, free and forced convection, mass transfer, psychometrics and thermodynamics of biological processes.

Corequisite: ENV 3040C or CGN 3421 or ESI 4327C or (COP 2271 and COP 2271L).

ABE 3652C Physical and Rheological Properties of Biological Materials 3 Credits

Grading Scheme: Letter Grade

Theory and use of physical and rheological properties of biological materials in agricultural engineering applications.

Prerequisite: CHM 2045 and MAC 2313 and PHY 2048.

ABE 4000 Nonpoint Source Pollution Modeling 2 Credits

Grading Scheme: Letter Grade

Concepts, principles, and application of modeling and monitoring for assessment and management of nonpoint source pollution. Design and implementation of monitoring systems. Concepts of modeling agroecosystems and land use impacts on hydrologic/water quality response of upland catchments. Model selection, calibration, validation and application for comparative analysis. Screening models using geographic information systems. Case studies in current watershed management issues with a focus on agricultural waste and nutrient management using existing field and watershed models.

ABE 4008 Control Methods in SmartAg Systems 3 Credits

Grading Scheme: Letter Grade

Design, analysis, simulation, and programming modern control methods for applications in production agriculture, biological and food engineering, land and water resources. Learn theoretical concepts, application programming, and simulation techniques using classical and modern control approaches, fuzzy logic, neural networks, and other intelligent learning algorithms.

Prerequisite: MAP 2302 and PHY 2048;

Corequisite: EGM 3400.

ABE 4033 Fundamentals and Applications of Biosensors 3 Credits

Grading Scheme: Letter Grade

Provides a broad introduction to the field of biosensors, as well as an in-depth and quantitative view of biosensor design and performance analysis. Fundamental application of biosensor theory will be demonstrated, including: recognition, transduction, signal acquisition, and post processing/data analysis.

Prerequisite: MAP 2302 and BSC 2010 and CHM 2200.

ABE 4034 Remote Sensing in Engineering: Science, Sensors and Applications 3 Credits

Grading Scheme: Letter Grade

Develop an understanding of remote sensing theory, systems and applications using information obtained from the visible/near infrared, thermal infrared and microwave regions of the EM spectrum.

Prerequisite: MAP 2302 or the equivalent.

ABE 4042C Biological Engineering Design 1 2 Credits**Grading Scheme:** Letter Grade

Design of engineered agricultural and biological systems and devices. Problem definition analysis, synthesis, project management, economic, environmental and social impacts. Individual and team projects.

ABE 4043C Biological Engineering Design 2 2 Credits**Grading Scheme:** Letter Grade

Senior capstone design project.

Prerequisite: senior standing (4EG), ABE 4042C and two courses in area of specialization.

ABE 4171 Power and Machines for Biological Systems 3 Credits**Grading Scheme:** Letter Grade

Design and specification of power and machine elements applied to agricultural, biological and land and water resources or food engineering; fundamentals of power units, design of machine elements and power transmission.

Prerequisite: EGM 3520 and (EGM 3400 or EGM 3401).

ABE 4231C Irrigation and Drainage Engineering 4 Credits**Grading Scheme:** Letter Grade

Irrigation and drainage systems design, including pump sizing and specification, water distribution systems, plant water requirement, drainage systems and flood control.

Prerequisite: ABE 3212C.

ABE 4303C Structural and Environmental Design 3 Credits**Grading Scheme:** Letter Grade

Design and analysis of structures and environmental modification systems used in agricultural production.

Prerequisite: ABE 2012C and ABE 3612C.

ABE 4413C Post-Harvest Operations Engineering 3 Credits**Grading Scheme:** Letter Grade

Engineering principles and practices of post-harvest operations for the maintenance of quality of agricultural products. Design of systems and facilities.

Prerequisite: ABE 3612C.

ABE 4641 Modeling Coupled Natural-Human Systems 3 Credits**Grading Scheme:** Letter Grade

Explore approaches to modeling coupled natural-human systems, drawing from both natural and social sciences. Topics include regime shift from dynamical systems and basic concepts from game theory and social-ecological system literature. These are combined in models that operationalize a conceptual framework. With guidance, develop models for final projects.

Prerequisite: MAC 2312 or equivalent.

ABE 4655C Bio-Based Products from Renewable Resources 3 Credits**Grading Scheme:** Letter Grade

Provides the knowledge for the production of fuels, chemicals, and materials from renewable resources; includes the fundamental principles and practical applications of bio-based products: biorefinery and biobased products overview, fundamental concepts in understanding biorefinery and biobased products; materials, chemical platforms, and fuels from biomass.

Prerequisite: (CHM 2045 or CHM 2095) and (CHM 2046 or CHM 2096) or equivalent general chemistry courses or instructor permission.

ABE 4660 Applied Microbial Biotechnology 3 Credits**Grading Scheme:** Letter Grade

Principles of microbial biotechnology with emphasis on applications of microorganisms for industrial processes; e.g., energy, environmental, food, pharmaceutical and chemical.

ABE 4662 Quantification of Biological Processes 3 Credits**Grading Scheme:** Letter Grade

Quantitative description and analysis of biological processes pertaining to microbes, plants, animals and ecosystems. Biological transport phenomena, bioenergetics, enzyme kinetics, metabolism, bioregulation, circulatory and muscle systems, agroecosystems. Analytical and experimental laboratory for development of quantitative skills.

Prerequisite: (ABE 2062 or BSC 2010) and (EGN 3353C or CWR 3201).

ABE 4812 Food and Bioprocess Engineering Unit Operations 4 Credits**Grading Scheme:** Letter Grade

Analysis of thermal freezing, evaporation, dehydration, contact equilibrium and mechanical separation processes as governed by the reaction kinetics and rheology of processed foods.

Prerequisite: ABE 3612C or CWR 3201 or EGN 3353C.

ABE 4905 Individual Study in Biological Engineering 1-4 Credits**Grading Scheme:** Letter Grade

Selected problems of projects in the student's major field of engineering study.

Prerequisite: recommendation of department chair.

ABE 4912 Integrated Product and Processing Design 1 in Biological Engineering 3 Credits**Grading Scheme:** Letter Grade

First part of a two-course sequence in which multidisciplinary teams of engineering and business students partner with industry sponsors to design and build authentic products and processes on time and within budget.

ABE 4913 Integrated Product and Process Design 2 in Biological Engineering 3 Credits**Grading Scheme:** Letter Grade

Second part of a two-course sequence in which multidisciplinary teams of engineering and business students partner with industry sponsors to design and build authentic products and processes on time and within budget.

Prerequisite: ABE 4912.

ABE 4931 Professional Issues in Agricultural and Biological Engineering 1 Credit**Grading Scheme:** Letter Grade

Current developments in agricultural and biological engineering, principles of agricultural and biological engineering practice and professional standards and ethics.

ABE 4932 Special Topics 1-4 Credits**Grading Scheme:** Letter Grade

Variable subjects provide content for the study of agricultural engineering topics not offered in other courses.

Prerequisite: instructor permission.

ABE 4935 Writing Grant Proposals for Scholarships and Fellowships 2 Credits**Grading Scheme:** Letter Grade

Introduces seniors in the Agricultural and Biological Engineering department to opportunities for obtaining scholarships, fellowships, internships, and teaching/research assistantships from federal funding agencies; includes funding sources and opportunities, provide guidelines for proposal writing. Requires preparing a proposal.

Prerequisite: Senior standing, must be pursuing a degree within the Agricultural and Biological Engineering department, and instructor permission.

ABE 4949 Work Experience in Biological Engineering 1-3 Credits

Grading Scheme: S/U

Work experience in the biological engineering industry with advisor approval. (S-U)

Prerequisite: Advisor approval

EGN 4912 Engineering Directed Independent Research 0-3 Credits

Grading Scheme: S/U

Provides firsthand, supervised research with a faculty advisor or postdoctoral or graduate student mentor. Projects may involve inquiry, design, investigation, scholarship, discovery or application. (S-U)
