ABE 2012C Introduction to Biological Engineering 3 Credits
Introduces the process of design along with approaches to solving engineering problems, manipulations and presentations of engineering data and applied engineering concepts. (WR)
Prereq: MAC 2311
WR2

ABE 2062 Biology for Engineers 3 Credits
Principles and engineering applications of biology. Principles and applications of biochemistry, genetics, microbial systems, animal systems, ecological systems and global systems. (B) (WR)
General Education - Biological Science
WR6

ABE 3000C Applications in Biological Engineering 3 Credits
Overview of the research and applications of biological engineering, such as bioprocessing, biotechnology, transport processes, biosensors, bioremediation, biological materials and biomedicine.
Prereq: BSC 2010 or equivalent

ABE 3212C Land and Water Resources Engineering 4 Credits
Introduces hydrology, flow through porous media, flood routing, grade control structures and erosion control.
Prereq: ENV 3040C and MAP 2302
Coreq: CWR 3201 or EGN 3353C

ABE 3612C Heat and Mass Transfer in Biological Systems 4 Credits
Transport phenomena, steady and unsteady-state heat conduction, radiation, free and forced convection, mass transfer, psychometrics and thermodynamics of biological processes.
Prereq: EML 3007
Coreq: ENV 3040C or CGN 3421 or ESI 4567C

ABE 3652C Physical and Rheological Properties of Biological Materials 3 Credits
Theory and use of physical and rheological properties of biological materials in agricultural engineering applications.
Prereq: CHM 2045, MAC 2313 and PHY 2048

ABE 4000 Nonpoint Source Pollution Modeling 2 Credits

ABE 4033 Fundamentals and Applications of Biosensors 3 Credits
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.
Prereq: MAP 2302, BSC 2100 and CHM 2200

ABE 4034 Remote Sensing in Engineering: Science, Sensors and Applications 3 Credits
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.
Prereq: MAP 2302 or the equivalent

ABE 4042C Biological Engineering Design 1 2 Credits
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
Senior capstone design project.
Prereq: senior standing (4EG), ABE 4042C and two courses in area of specialization

ABE 4171 Power and Machines for Biological Systems 3 Credits
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.
Prereq: EGM 3520 and EML 3007

ABE 4231C Irrigation and Drainage Engineering 4 Credits
Irrigation and drainage systems design, including pump sizing and specification, water distribution systems, plant water requirement, drainage systems and flood control.
Prereq: ABE 3212C

ABE 4303C Structural and Environmental Design 3 Credits
Design and analysis of structures and environmental modification systems used in agricultural production.
Prereq: ABE 2012C and ABE 3612C

ABE 4413C Post-Harvest Operations Engineering 3 Credits
Engineering principles and practices of post-harvest operations for the maintenance of quality of agricultural products. Design of systems and facilities.
Prereq: ABE 3612C

ABE 4655C Bio-Based Products from Renewable Resources 3 Credits
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.
Prereq: 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
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
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.

ABE 4812 Food and Bioprocess Engineering Unit Operations 4 Credits
Analysis of thermal freezing, evaporation, dehydration, contact equilibrium and mechanical separation processes as governed by the reaction kinetics and rheology of processed foods.
Prereq: ABE 3612C, CWR 3201 or EGN 3353C

ABE 4905 Individual Study in Biological Engineering 1-4 Credits
Selected problems of projects in the student's major field of engineering study.
Prereq: recommendation of department chair

ABE 4912 Integrated Product and Processing Design 1 in Biological Engineering 3 Credits
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
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.
Prereq: ABE 4912

ABE 4931 Professional Issues in Agricultural and Biological Engineering 1 Credit
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
Variable subjects provide content for the study of agricultural engineering topics not offered in other courses.
Prereq: instructor permission

ABE 4935 Writing Grant Proposals for Scholarships and Fellowships 2 Credits
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.
Prereq: 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
Work experience in the biological engineering industry with advisor approval. (S-U)

EGN 4912 Engineering Directed Independent Research 3 Credits
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)