Class Schedule - Spring 2019

Agricultural and Biological Engineering

Agricultural and Biological Engineering
Interim Head of Department: Alan C. Hansen
Department Office: 338 Agricultural Engineering Sciences Building, 1304 West Pennsylvania Avenue, Urbana
Phone: 217-333-3570
www.abe.illinois.edu
Subjects associated with this department include: Agricultural and Biological Engineering (ABE) and Technical Systems Management (TSM).

ABE 141  **ABE Principles: Biological**  credit: 2 hours.
Principles of biology relevant to agriculture, food, energy, and the environment, including microbiology, biochemistry, genetics, plant and animal systems, and ecosystems. Case studies of engineering applications where these biological principles have been taken into account or leveraged for the purpose of design.

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<th>Days</th>
<th>Location</th>
<th>Instructor</th>
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<tbody>
<tr>
<td>54768</td>
<td>Lecture-Discussion</td>
<td>MGD</td>
<td>10:00 AM - 10:50 AM</td>
<td>F</td>
<td>204 - Agricultural Engr Sciences Bld</td>
<td>Bhalerao, K</td>
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<td>10:00 AM - 10:50 AM</td>
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ABE 199  **Undergraduate Open Seminar**  credit: 1 TO 5 hours.
May be repeated to a maximum of 12 hours.

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<td>10141</td>
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Instructor Approval Required

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<th>Days</th>
<th>Location</th>
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<tr>
<td>68015</td>
<td>Discussion/Recitation</td>
<td>AMB</td>
<td>01:00 PM - 01:50 PM</td>
<td>T</td>
<td>242 - Agricultural Engr Sciences Bld</td>
<td>Boone, A</td>
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</tbody>
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Credit Hours: 1 hours
ABE@IL Ambassador Training
Instructor Approval Required
The purpose of this course is to equip ABE@Illinois Ambassadors with the ability to increase visibility of the ABE and TSM disciplines. We will develop your oral and written communication skills. Students will learn to effectively articulate what we do and why it matters to prospective students, current students, alumni, donors, company representatives, and friends of the department. We will improve the ABE@Illinois Community by hosting, coordinating, and attending community building events.

ABE 225  **ABE Principles: Bioenvironment**  credit: 2 hours.
Principles of environmental control for biological structures: psychrometrics; mass and heat transfer through buildings; ventilation requirements. Prerequisite: One of MATH 220, MATH 221, MATH 234.

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Meets 14-Jan-19 - 08-Mar-19.

ABE 226  **ABE Principles: Bioprocessing**  credit: 2 hours.
Principles of bioprocess engineering applied to food and agricultural products: material balances; fluid flow; heat and mass transfers; drying; evaporation; fermentation; distillation; process simulation. Prerequisite: One of MATH 220, MATH 221, MATH 234.

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ABE 397  **Independent Study**  credit: 1 TO 4 hours.
Individual research, special problems, thesis, development or design work under the supervision of a member of the faculty. May be repeated to a maximum of 8 hours. Prerequisite: Consent of instructor.
ABE 425  **Engrg Measurement Systems**  credit: 4 hours.
Principles of instrumentation systems, including sensing, signal conditioning, computerized data acquisition, test design, data analysis and synthesis. Additional fees may apply. See Class Schedule. 4 undergraduate hours. 4 graduate hours. Credit is not given for both ABE 425 and ME 360. Prerequisite: ECE 205.

ABE 440  **Applied Statistical Methods I**  credit: 4 hours.
Same as ANSC 440, CPSC 440, FSHN 440, and NRES 440. See CPSC 440.
Students must register for one lab-discussion and one lecture section.
ABE 446  **Biological Nanoengineering**  credit: 3 OR 4 hours.

Nanodevice design through organization of functional biological components; bio-molecular function and bioconjugation techniques in nanotechnology; modulation of biological systems using nanotechnology; issues related to applying biological nanotechnology in food energy, health, and the environment. 3 undergraduate hours. 4 graduate hours. Prerequisite: MCB 150.

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Credit Hours: 3 hours
Not intended for students with Graduate I or Graduate II class standing.

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Credit Hours: 4 hours
Not intended for students with Freshman, Sophomore, Junior, or Senior class standing.

ABE 456  **Land & Water Resources Engrg**  credit: 3 OR 4 hours.

Hydrology, hydraulics, design, construction and cost estimating of structures for the conservation and quality control of soil and water resources; relationship of topography, soils, crops, climate, and cultural practices in conservation and quality control of soil and water for agriculture. 3 undergraduate hours. 3 or 4 graduate hours. Prerequisite: Credit or concurrent registration in TAM 335.

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Restricted to Graduate - Urbana-Champaign.

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<td>M</td>
<td>208 - Agricultural</td>
<td>Bhattarai, R</td>
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</table>
ABE 457  **NPS Pollution Processes**  credit: 2 hours.
Principles, concepts, and analysis of processes for nonpoint source pollution involving sediment, inorganic and organic chemicals, and microbial pathogens; hydrologic and pollutant interactions, pollutant fate and transport processes from storm water runoff and percolation; impact of pollutant transport on receiving water and ecosystems. 2 undergraduate hours. 2 graduate hours. Prerequisite: ABE 224 or CEE 350.

Meets 14-Jan-19 - 08-Mar-19.

ABE 458  **NPS Pollution Modeling**  credit: 2 hours.
Concepts, principles, and application of modeling for assessment and management of agricultural nonpoint source pollution. Modeling of agroecosystems and land use impacts on hydrologic and water quality response of upland catchments. Model selection, calibration, validation, and application for comparative analysis. Case studies in current watershed management issues, with a focus on agricultural waste and nutrient management, using existing field and watershed nonpoint source pollution models. 2 undergraduate hours. 2 graduate hours. Prerequisite: ABE 457.


ABE 469  **Industry-Linked Design Project**  credit: 4 hours.
Industry-submitted and sponsored design projects which utilize principles of design, engineering analysis and functional operation of engineering systems. Design teams develop concepts, evaluate alternatives, model and analyze solutions, and build and test a final product. Emphases on communication skills, technical writing, and interaction with industry representatives. 4 undergraduate hours. 4 graduate hours. Prerequisite: One of ABE 361, CHBE 421, TAM 335; or credit or concurrent registration in ME 370.
This course satisfies the General Education Criteria for a:
Advanced Composition

Credit Hours: 3 hours
Restricted to Undergrad - Urbana-Champaign.
Advanced Composition course. Lab section details TBA

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<td>242 - Bevier Hall</td>
<td>Kalita, P Onstad, N</td>
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<td></td>
<td>Lecture-Discussion</td>
<td>AE1</td>
<td>12:00 PM - 12:50 PM</td>
<td>MW</td>
<td>204 - Agricultural Engr Sciences Bld</td>
<td>Kalita, P Onstad, N</td>
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Advanced Composition course. Restricted to Technical Systems Management or Engineering Mechanics or Mechanical Engineering or Agricultural & Biological Engr major(s). Restricted to students with Senior class standing.

**ABE 474 Indoor Environmental Control**  credit: 3 OR 4 hours.
Analysis of indoor environments and relationship with humans, animals and plants. Interactions between facilities operation and both human comfort and animal plant production. Psychrometrics, occupant health and comfort, structural heat transfer, heating and cooling loads, and energy and mass balances as related to indoor environment, air properties, and ventilation. 3 undergraduate hours. 3 or 4 graduate hours. Prerequisite: TAM 335, and ME 300 or CHBE 321, or consent of instructor.

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<tr>
<td>66784</td>
<td>Online</td>
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<td>ARRANGED -</td>
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ABE 474 course materials will be delivered in an online format and will not require specific weekly meeting times. This class will have simulated labs that require Microsoft Excel and Word, Adobe Acrobat, and Matlab software. Textbook required: Heating, Ventilating and Air Conditioning Analysis and Design. 6th Edition. 2004. McQuiston, Parker, Spitie, John Wiley and Sons, Inc.

**ABE 497 Independent Study** credit: 1 TO 4 hours.
Individual research, special problems, thesis, development or design work under the supervision of a member of the faculty. 1 to 4 undergraduate hours. No graduate credit. May be repeated to a maximum of 8 hours. Prerequisite: Consent of instructor.

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Departmental Approval Required

**ABE 498 Special Topics** credit: 0 TO 4 hours.
Subject offerings of new and developing areas of knowledge in agricultural and biological engineering intended to augment the existing curriculum. See Class Schedule or departmental course information for topics and prerequisites. 1 to 4 undergraduate hours. 1 to 4 graduate hours. May be repeated in the same or separate terms if topics vary to a maximum of 16 hours.

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Instructor Approval Required
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<td>69046</td>
<td>Lecture-Discussion</td>
<td>AW1</td>
<td>09:30 AM - 10:50 AM</td>
<td>TR</td>
<td>212 - David Kinley Hall</td>
<td>Jahnke, K Witmer, A</td>
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Credit Hours: 3 hours  
Contextual Engineering  
Restricted to students with Freshman, Sophomore, Junior, or Senior class standing.

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<tr>
<td>69527</td>
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<td>AW2</td>
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<td>212 - David Kinley Hall</td>
<td>Jahnke, K Witmer, A</td>
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Credit Hours: 4 hours  
Contextual Engineering  
Not intended for students with Freshman, Sophomore, Junior, or Senior class standing.

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<td>68204</td>
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<td>T</td>
<td>146 - Armory</td>
<td>Harbourt, C</td>
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Credit Hours: 2 hours  
Innovative Entr & Leadership  
Course title: Innovative Entrepreneurship and Leadership

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<tr>
<td>68117</td>
<td>Lecture-Discussion</td>
<td>DRP</td>
<td>05:00 PM - 06:20 PM</td>
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<td>3117 - Everitt Laboratory</td>
<td>Barnard, J Blumthal, M Rodriguez, L</td>
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Travel | DRP | ARRANGED - | - | Barnard, J Blumthal, M Rodriguez, L |

Credit Hours: 3 hours  
Dis Relief Proj - Hurric Maria  
Title: Disaster Relief Projects: Hurricane Maria This course is a faculty led study tour to areas of the world which have recently suffered from or may be susceptible to natural disasters. The course is designed to engage students in the development of pathways towards sustainable and resilient designs for food, energy, and water supply chains suited for such disaster-prone regions. Students will investigate background cultural, political, and social factors that provide context for specific disaster-prone regions. Students will be trained in the assessment of the viability of potential technological solutions and their resilience when responding to current and anticipated challenges for the regional societies. Students will be trained in the safety issues associated with entering potentially dangerous areas. Students will work with local communities, aid organizations, and peer instructions in the identification and implementation of sustainable responses. Students will document their visit and their assessments providing a prioritized action plan and designs supporting sustainable and resilient development of these regions. This course is part 1 of a two-course sequence (ABE 498-492). Enrollment in at least one course within the two-course sequence is required to participate in the faculty lead study tour. This course may be repeated if topics vary. In part 1 of the two-course sequence, the learning objective of the course will be met via projects that will train and prepare students for project-based learning experiences while traveling to the disaster-prone regions. Students will identify problems, propose solutions, and prepare the team to execute on potential solutions while in-country. PROGRAM FEE: Students registered in this section pay a study abroad fee assessed through an appropriate Study Abroad Office, which covers the cost of round trip airfare, ground transportation, lodging, and in-country programming. Scholarships are available. Students should contact their college study abroad office for more information about scholarships. See http://www.studyabroad.illinois.edu for more information about the study tour and to complete a study abroad application for "ACES/Engineering Global Service Learning Disaster Relief Projects: Hurricane Maria." The deadline for applications is January 18, 2019. PLEASE CONTACT INSTRUCTOR AT LFR@ILLINOIS.EDU FOR ANY QUESTIONS.

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<tr>
<td>69694</td>
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<td>XW3</td>
<td>06:30 PM - 07:50 PM</td>
<td>MR</td>
<td>204 - Agricultural Engr Sciences Bld</td>
<td>Wang, X</td>
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</table>

Credit Hours: 3 hours  
ENGINEERING DESIGN FOR A NET-ZERO SOLAR SMART-HOME Students will work as an interdisciplinary team to design a net-zero solar smart-home for the DoE Race to Zero design competition and Solar Decathlon 2020, including an innovative architectural design; efficient HVAC system; photovoltaic power generation; high-efficiency water systems; smart lighting, appliances and home
automation; and construction and financial planning. Students will work directly with industry partners and participate in DoE green building training.

ABE 594  **Graduate Seminar**  credit: 0 hours.
Presentations of thesis research by graduate students; other presentations on teaching or current research issues related to agricultural and biological engineering. Approved for S/U grading only. May be repeated up to a maximum of 6 times.

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<td>F</td>
<td>204 - Agricultural Engr Sciences Bld</td>
<td>Zhang, Y</td>
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ABE 597  **Independent Study**  credit: 1 TO 4 hours.
Individual investigations or studies of any phases of agricultural engineering selected by the student and approved by the advisor and the faculty member who will supervise the study. May be repeated to a maximum of 16 hours. Prerequisite: Consent of instructor.

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Instructor Approval Required

ABE 598  **Special Topics**  credit: 1 TO 4 hours.
Subject offerings of new and developing areas of knowledge in agricultural and biological engineering intended to augment the existing curriculum. See Class Schedule or departmental course information for topics and prerequisites. May be repeated in the same or separate terms if topics vary to a maximum of 8 hours.

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<td>11:00 AM - 12:20 PM</td>
<td>TR</td>
<td>218 - Ceramics Building</td>
<td>Chowdhary, G</td>
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Credit Hours: 4 hours

Autonomous Decision Making
Title: Principles of Autonomous Decision Making in the Real-World. The objective of this course is to cover theory and techniques essential for building cyber-physical systems capable of autonomous decision making in the real-world. This course will lay a foundation for theory and techniques in autonomous planning, machine learning, and adaptive sequential decision making. Topics covered include Planning under uncertainty, Bayesian Nonparametric machine learning, Neural Networks, Markov Decision Processes, and Reinforcement Learning. Student chosen applied projects, involving real aerial and ground robots, are a key element of this course.

ABE 599  **Thesis Research**  credit: 0 TO 16 hours.
Approved for S/U grading only. May be repeated.

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