Agricultural Engineering—Descriptions of Courses

855. Agricultural Production Economics
   Spring, 3(2-0)
   P: EC 801, EC 805
   Agricultural applications of static production economics, including study of capital inputs that yield services over several time periods. Investment and distribution models. Methods for incorporating risk and technological change.
   QP: EC 400, EC 605A QA: AEC 805

861. Agriculture in Economic Development
   Fall, 3(3-0)
   QA: AEC 862

865. Agricultural Benefit-Cost Analysis
   Spring, 3(2-0)
   Benefit-cost analysis of agricultural and natural resource projects, including financial and economic analysis. Case studies in project design and appraisal in low and high income countries.
   QA: AEC 863

890. Independent Study
   Fall, Spring, Summer, 1 to 3 credits. A student may earn a maximum of 8 credits in all enrollments for this course.
   R: Open only to graduate students in Agricultural Economics. Approval of department.
   Independent study of selected topics in agricultural economics.
   QA: AEC 892

901. Topics in Agricultural Economics
   Fall, Spring, Summer, 2 to 3 credits. A student may earn a maximum of 12 credits in all enrollments for this course.
   R: Open only to graduate students in colleges of Agriculture and Natural Resources, Social Science, and Business. Selected topics such as agribusiness management, applied operations research, or rural development policy.

908. Master's Research
   Fall, Spring, Summer, 1 to 4 credits. A student may earn a maximum of 4 credits in all enrollments for this course.
   R: Open only to graduate students in Agricultural Economics. Approval of department.
   Master's degree Plan B research.
   QA: AEC 898

909. Master's Thesis Research
   Fall, Spring, Summer, 1 to 6 credits. A student may earn a maximum of 9 credits in all enrollments for this course.
   R: Open only to graduate students in Agricultural Economics. Approval of department.
   QA: AEC 899

923. Theory of Resource and Environmental Economics
   Spring of odd numbered years, 3(3-0)
   Interdepartmental with Resource Development, Forestry, Park and Recreation Resources, and Economics.
   P: AEC 825, EC 805
   QP: EC 805A

947. Analysis of Food Systems Organization
   Summer, 3(3-0)
   P: AEC 810, AEC 841, AEC 845
   Public and private policy issues related to the organization and performance of food systems.
   QA: AEC 941

991. Advanced Topics in Agricultural Economics (MTC)
   Fall, Spring, Summer, 2 credits.
   A student may earn a maximum of 12 credits in all enrollments for this course.
   R: Open only to Ph.D. students in Agricultural Economics. Approval of department; application required.
   Price analysis, development, risk, trade, dynamic modeling, research methods, finance and environmental economics.
   QA: AEC 995

999. Doctoral Dissertation Research
   Fall, Spring, Summer, 1 to 24 credits.
   A student may earn a maximum of 99 credits in all enrollments for this course.
   R: Open only to Ph.D. students in Agricultural Economics. Approval of department.
   QA: AEC 999

AGRICULTURAL ENGINEERING AE

Department of Agricultural Engineering
College of Agriculture and Natural Resources

152. Food and Agricultural Engineering
   Spring, 12(2-0)
   R: Open only to freshmen and sophomores. International and national food issues including conservation of natural resources, energy requirements, and effects of political changes on food supplies and American agriculture. Production, processing, and distribution of food.
   QA: AE 152

366. Principles of Agricultural Machines
   Fall, Spring, 3(3-0)
   P: MSM 211, CE 321 or CH 331 or AE 332. R: Open only to Engineering majors.
   Processes performed by agricultural production machines. Power systems, tillage mechanics, traction, metering, distribution, conveying, fluidization, mixing, separation, and automation. Machinery management.
   QP: MCM 211, AE 321, AE 332, CHE 340 QA: AE 374

388. Principles of Food Processing Equipment
   Spring, 3(3-0)
   P: CE 321 or CH 331 or AE 332; MSM 211. R: Open only to students in College of Engineering.
   Principles of design, operation, and performance of equipment for processing raw materials into finished or intermediate products.
   QP: MCM 211, CE 321, AE 332, CHE 340 QA: AE 374

393. Engineering Principles of the Plant Environment
   Fall, 3(3-0)
   P: BOT 105 or RS 110; CEM 141, MTH 235, MTH 201. R: Open only to Engineering majors.
   QA: AEC 393

356. Electric Power and Control Systems
   Spring, 3(3-0)
   P: EE 200 or EE 345. R: Open only to majors in College of Engineering.
   Alternating current circuits, power distribution, electrical machines, protection, and programmable motor controllers. Design project related to food and agricultural industries.
   QP: PHY 208, EE 245, EE 300 QA: AE 356

430. Power and Control Hydraulics
   Spring, 3(2-2)
   P: CE 321 or CH 311 or ME 332. R: Open only to majors in College of Engineering.
   QP: CE 231, CHE 340, ME 332 QA: AE 493

438. Design of Machinery Structures
   Fall, 3(3-0)
   P: MSM 306; AE 356 or AE 328. R: Open only to majors in College of Engineering. Not open to students with credit in ME 471.
   QP: MME 211 QA: AE 481

481. Agricultural and Small Watershed Hydrology
   Spring, 4(5-0)
   P: CPS 130 or CFS 131; CE 321 or CHE 311 or ME 332, AE 356 or CE 312. R: Open only to Engineering majors.
   Relationships between rainfall, infiltration, runoff, interflow, subsurface drainage, ephemeral streamflow, and soil erosion. Runoff prediction using computer modeling of runoff.
   QP: CPS 112, CE 321, CHE 311, ME 332 QA: AE 481

486. Agricultural Engineering Design Fundamentals
   Fall, 3(3-0)
   P: AE 356 or AE 363 or AE 356. R: Open only to seniors and graduate students in College of Engineering.
   Concepts, methods, and procedures of the total design process from problem identification to final specifications.
   QA: AE 486

488. Agricultural Engineering Design Project
   Spring, 3(0-6)
   P: AE 486. R: Open only to seniors in College of Engineering.
   Independent or team design project selected in AE 486. Information, exploration, development of alternatives, and evaluation, selection, and completion of a design project.
   QA: AE 496

490. Independent Study
   Fall, Spring, Summer, 1 to 5 credits. A student may earn a maximum of 5 credits in all enrollments for this course.
   P: AE 152 or AE 361 or MTH 235. R: Open only to College of Engineering majors. Approval of department; application required.
   Supervised individual student research and study in agricultural engineering.
   QP: AE 152, ME 391, MTH 310 QA: AE 490

491. Special Topics in Agricultural Engineering
   Fall, Spring, Summer, 1 to 4 credits. A student may earn a maximum of 12 credits in all enrollments for this course.
   P: AE 152 or MTH 235. R: Open only to College of Engineering majors. Approval of department.
   Special topics in agricultural engineering.
   QP: AE 152, MTH 310 QA: AE 490

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Agricultural Engineering—Descriptions of Courses

815. Instrumentation for Food and Agricultural Engineering
Fall. 3(3-0)
R: Open only to graduate students in College of Engineering.
This course is designed to provide an understanding of the theory and methods of measurement in food and agricultural engineering. It covers the physical principles of temperature, pressure, flow, and moisture measurement. The course includes both theoretical and practical aspects of instrumentation.
QA: AE 815

AGRICULTURAL TECHNOLOGY AND SYSTEMS MANAGEMENT

ATM Department of Agricultural Engineering
College of Agriculture and Natural Resources
College of Engineering

315. Occupational and Personal Safety
Spring. 2(2-0)
P: CSS 101 or ANS 110 or AEE 101 or HRT 201. R: Open only to College of Agricultural and Natural Resources majors. Principles of safety problem solving, accident causation and prevention. Laws and regulations. Media, electrical, chemical, and fire safety. Safety program development.
QA: ATM 415

326. Principles of Animal Environments
Spring. 3(3-0)
P: MTH 116 or MTH 120. CFS 100 or CFS 130 or CFS 131. R: Open only to College of Agriculture and Natural Resources majors. Principles of animal environments. Heat and moisture balances for confined livestock.
QA: ATM 426

431. Irrigation, Drainage and Erosion Control Systems
Fall. 3(2-2)
P: MTH 116 or MTH 120; CFS 210. R: Not open to freshmen and sophomores. Principles of soil and water conservation engineering including: land and soil surveying, basic hydraulics, hydrology, soil moisture, and soil and water conservation practices. In-service training programs. Irrigation and drainage systems.
QA: ATM 431

440. Agricultural Machinery Systems
Fall. 3(3-0)
P: CFS 210 or MTH 110 or MTH 116, CFS 100 or CFS 130 or CFS 131. R: Open only to majors in College of Agriculture and Natural Resources. Principles, analysis, management, and economics of agricultural machinery systems. Consideration of weather conditions, cultural practices, crop rotations, labor, and energy. Systems approach to equipment selection.
QA: ATM 440

490. Independent Study
Fall, Spring, Summer. 1 to 4 credits. A student may earn a maximum of 6 credits in all enrollments for this course.
QA: ATM 490

499. Doctoral Dissertation Research
Fall, Spring, Summer. 1 to 24 credits. A student may earn a maximum of 8 credits in all enrollments for this course.
QA: AE 499

499. Doctoral Dissertation Research
Fall, Spring, Summer. 1 to 24 credits. A student may earn a maximum of 8 credits in all enrollments for this course.
QA: AE 499

499. Doctoral Dissertation Research
Fall, Spring, Summer. 1 to 24 credits. A student may earn a maximum of 8 credits in all enrollments for this course.
QA: AE 499

812. Bio-Processing Engineering
Spring of even-numbered years. 3(3-0)
R: Open only to graduate students in College of Engineering.
Thermodynamics, heat and mass transfer, fluid flow, dehydration. Handling and storage of biological products.
QA: AE 812

820. Research Methods in Agricultural Engineering
Fall. 1(1-0)
R: Open only to graduate students in College of Agriculture and Natural Resources or College of Engineering.
Procedures and methods for designing and executing research projects. Research methods and statistical analysis.
QA: AE 820

820. Research Methods in Agricultural Engineering
Fall. 1(1-0)
R: Open only to graduate students in College of Agriculture and Natural Resources or College of Engineering.
Procedures and methods for designing and executing research projects. Research methods and statistical analysis.
QA: AE 820

830. Dimensional Analysis and Similarity Modelling
Fall. 3(2-3)
R: Open only to graduate students in College of Agriculture and Natural Resources or College of Engineering.
Dimensional concepts, systems of measurements and transformation of units, and formation of dimensionless groups. Development of prediction equations, concepts of similarity, and scaling laws. Distortion. Scale models.
QA: AE 830

882. Irrigation and Water Management Engineering
Spring of odd-numbered years. 3(3-0)
P: AE 481, CE 421. R: Open only to graduate students in College of Agriculture and Natural Resources or College of Engineering.
Design and management of systems for supplemental irrigation, water supply and transport. Economic and engineering optimization of irrigation design.
QA: AE 482

890. Special Problems
Fall, Spring, Summer. 1 to 3 credits. A student may earn a maximum of 6 credits in all enrollments for this course.
R: Approval of department; application required. Individual study in agricultural engineering.
QA: AE 890

890. Agricultural Engineering Seminar
Spring. 1(1-0)
R: Open only to graduate students in College of Agriculture and Natural Resources or College of Engineering.
Current topics in agricultural engineering.
QA: AE 892

900. Advanced Topics in Agricultural Engineering
Fall, Spring, Summer. 1 to 3 credits. A student may earn a maximum of 6 credits in all enrollments for this course.
R: Open only to graduate students in College of Engineering. Approval of department. Agricultural engineering topics not covered in regular courses.
QA: AE 900

900. Advanced Topics in Agricultural Engineering
Fall, Spring, Summer. 1 to 3 credits. A student may earn a maximum of 6 credits in all enrollments for this course.
R: Open only to graduate students in College of Engineering. Approval of department. Agricultural engineering topics not covered in regular courses.
QA: AE 900

900. Advanced Topics in Agricultural Engineering
Fall, Spring, Summer. 1 to 3 credits. A student may earn a maximum of 6 credits in all enrollments for this course.
R: Open only to graduate students in College of Engineering. Approval of department. Agricultural engineering topics not covered in regular courses.
QA: AE 900

930. Agricultural Machinery Systems
Fall. 3(3-0)
P: CFS 210 or MTH 110 or MTH 116, CFS 100 or CFS 130 or CFS 131. R: Open only to majors in College of Agriculture and Natural Resources. Principles, analysis, management, and economics of agricultural machinery systems. Consideration of weather conditions, cultural practices, crop rotations, labor, and energy. Systems approach to equipment selection.
QA: ATM 440

940. Agricultural Machinery Systems
Fall. 3(3-0)
P: CFS 210 or MTH 110 or MTH 116, CFS 100 or CFS 130 or CFS 131. R: Open only to majors in College of Agriculture and Natural Resources. Principles, analysis, management, and economics of agricultural machinery systems. Consideration of weather conditions, cultural practices, crop rotations, labor, and energy. Systems approach to equipment selection.
QA: ATM 440

940. Agricultural Machinery Systems
Fall. 3(3-0)
P: CFS 210 or MTH 110 or MTH 116, CFS 100 or CFS 130 or CFS 131. R: Open only to majors in College of Agriculture and Natural Resources. Principles, analysis, management, and economics of agricultural machinery systems. Consideration of weather conditions, cultural practices, crop rotations, labor, and energy. Systems approach to equipment selection.
QA: ATM 440

940. Agricultural Machinery Systems
Fall. 3(3-0)
P: CFS 210 or MTH 110 or MTH 116, CFS 100 or CFS 130 or CFS 131. R: Open only to majors in College of Agriculture and Natural Resources. Principles, analysis, management, and economics of agricultural machinery systems. Consideration of weather conditions, cultural practices, crop rotations, labor, and energy. Systems approach to equipment selection.
QA: ATM 440

990. Special Problems
Fall, Spring, Summer. 1 to 4 credits. A student may earn a maximum of 4 credits in all enrollments for this course.
R: Approval of department; application required. Individual study of selected topics.
QA: AE 880

990. Special Problems
Fall, Spring, Summer. 1 to 4 credits. A student may earn a maximum of 4 credits in all enrollments for this course.
R: Approval of department; application required. Individual study of selected topics.
QA: AE 880

990. Special Problems
Fall, Spring, Summer. 1 to 4 credits. A student may earn a maximum of 4 credits in all enrollments for this course.
R: Approval of department; application required. Individual study of selected topics.
QA: AE 880

990. Special Problems
Fall, Spring, Summer. 1 to 4 credits. A student may earn a maximum of 4 credits in all enrollments for this course.
R: Approval of department; application required. Individual study of selected topics.
QA: AE 880

990. Special Problems
Fall, Spring, Summer. 1 to 4 credits. A student may earn a maximum of 4 credits in all enrollments for this course.
R: Approval of department; application required. Individual study of selected topics.
QA: AE 880