802. Program Administration in Agricultural and Extension Education
Fall. 3(3-0)
Organizational and management concepts and practices in agricultural and extension education.
QA: AEE 851

803. Instructional Strategies in Agricultural and Extension Education
Spring. 3(3-0)
Assessment of learning needs. Development, selection, use and evaluation of teaching strategies. Emphasis on agriscience education and adult learners.
QA: AEE 824

804. Communication Strategies in Agricultural and Extension Education
Fall. 3(3-0)
R: Open only to seniors and graduate students in College of Agriculture and Natural Resources.
Information delivery systems and presentation techniques for varied agricultural and extension audiences.
QA: AEE 830

805. Leadership Development in Agricultural and Extension Education
Spring. 3(3-0)
Assessment of values, style, behavior, principles. Philosophical and sociological bases for leadership development. Applications.
QA: AEE 858

806. Program Planning and Evaluation in Agricultural and Extension Education
Spring of even-numbered years, Summer of even-numbered years. 3(3-0)
Principles, theories, and practices in developing and evaluating state and local agricultural and extension education programs.
QA: AEE 810, AEE 860

807. Research in Agricultural and Extension Education
Fall. 3(3-0)
R: Open only to graduate students in College of Agriculture and Natural Resources.
Planning, designing, conducting, and reporting research in agricultural and extension education.
QA: AEE 881

811. Education Through Extension
Fall. 3(3-0)
Function, organization, and operation of extension education programs.
QA: AEE 806

821. Principles and Philosophies of Agriscience Education
Summer. 3(3-0)
Principles and philosophies for analyzing and developing agriscience education courses, curricula, and programs.
QA: AEE 820

822. Teaching Supervised Agriscience Experiences
Summer of odd-numbered years. 3(3-0)
R: Open only to graduate students in Agricultural and Extension Education.
Principles and practices of agriscience laboratory teaching in high schools.
QA: AEE 826, AEE 822

890. Independent Study in Agricultural and Extension Education
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.

QA: AEE 883

891. Selected Topics in Agricultural and Extension Education
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 Agricultural and Extension Education.
Contemporary issues and problems in agricultural and extension education.
QA: AEE 881

892. Seminar in Agricultural and Extension Education
Fall, Spring. 1(1-0) A student may earn a maximum of 2 credits in all enrollments for this course.
Selected issues in agricultural and extension education.
QA: AEE 885

893. Professional Field Experience in Agricultural and Extension Education
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 and Extension Education.
Practice, observation, and analysis through field experiences.
QA: AEE 812A, AEE 812B

898. Master's Research
Fall, Spring, Summer. 1 to 5 credits. A student may earn a maximum of 5 credits in all enrollments for this course.
R: Open only to master's degree students in Agricultural and Extension Education.
Master's Plan B Research.
QA: AEE 889

899. Master's Thesis Research
Fall, Spring, Summer. 1 to 6 credits. A student may earn a maximum of 99 credits in all enrollments for this course.
R: Open only to master's degree students in Agricultural and Extension Education.

QA: AEE 899

901. International Agricultural and Extension Education Systems
Spring. 3(3-0)
P: AEE 801 or AEE 811 or AEE 821. R: Open only to graduate students in Agricultural and Extension Education.
Systems of agricultural and extension education in different countries. Philosophical and structural differences and similarities.

907. Research Project Design and Implementation
Spring. 3(3-0)
P: AEE 807 or approval of department.
Selection and development of research instruments. Quantitative and qualitative data analysis in agricultural and extension education.
QP: AEE 881

911. Nonformal Learning
Fall of even-numbered years, , Summer of odd-numbered years. 3(3-0)
P: AEE 811.
Theories and philosophies of learning in out-of-school settings. Alternative strategies.
QP: AEE 806

912. Advanced Extension Administration
Spring. 3(3-0)
P: AEE 802. R: Open only to graduate students in College of Agriculture and Natural Resources.
Advanced practices and applications necessary for effective management and administration within extension education.

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 and Extension Education.

QA: AEE 999

AGRICULTURAL ECONOMICS AEC

Department of Agricultural Economics
College of Agriculture and Natural Resources

810. Institutional and Behavioral Economics
Fall. 3(3-0) Interdepartmental with Economics and Resource Development.
Relationships among institutions, individual and collective actions, and economic performance. Public choice, property rights, and behavioral theories of firms and bureaucracies.
QA: AEC 810, AEC 809

815. Applied Welfare Economics in Agriculture
Fall of odd-numbered years. 3(3-0)
P: EC 801; EC 805 or EC 812A; EC 809 or EC 813A.
Concepts and issues in welfare economics with application to agricultural development, policy and trade, marketing and finance, and environmental policy.
QP: EC 480, EC 805A, EC 812A, EC 805B, EC 813A

817. Political Economy of Agricultural and Trade Policy
Spring. 3(3-0)
P: EC 805 or EC 812A; EC 809 or EC 813A.
Concepts of policy analysis and decision. Agricultural sector problems, behavior, and policy in the development process. Macroeconomic and trade impacts. International policies affecting trade and development. Current policy issues.
QP: EC 805A, EC 812A, EC 805B, EC 813A QA: AEC 860, AEC 861

829. The Economics of Environmental Resources
Fall. 3(3-0) Interdepartmental with Resource Development, Forestry, Park and Recreation Resources, and Economics.
Economic principles related to environmental conflicts and public policy alternatives. Applications to water quality, land use, conservation, development, and global environmental issues.

835. Introductory Econometrics
Summer. 3(3-0)
P: STT 430.
Estimation and interpretation of multiple regression models and their modifications when usual assumptions are not valid. Applications focus on problems faced by agricultural economists.
QP: STT 422 QA: EC 835

841. Organization and Performance of Agricultural Markets
Spring. 3(3-0)
R: Open only to graduate students in College of Agriculture and Natural Resources.
Analytical approaches. Institutions and processes for coordinating food and agricultural systems. Issues of organization, control and public policy.
QA: AEC 841

845. Commodity Market Analysis
Fall. 3(3-0)
P: AEC 835.
Applied econometric analysis of commodity markets. Emphasis on specification and estimation of demand and supply models for forecasting. Modeling for policy evaluation. Futures and options markets. Microcomputer applications.
QP: AEC 835 QA: AEC 843

851. Agricultural Firm Management
Summer. 3(3-0)
Managerial processes for planning and controlling agricultural firms. Applications of financial concepts, budgets, simulations, and cognitive and information systems to developed and developing countries. Predictive and prescriptive analysis.
QA: AEC 851

855. Agricultural Production Economics
Spring. 3(3-0)
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 disinvestment models. Methods for incorporating risk and technological change.
QP: EC 480, EC 805A QA: AEC 805

861. Agriculture in Economic Development
Fall. 3(3-0)
Role of agriculture in economic development of low- and middle-income countries. Theories of agricultural growth. Policy issues. Case studies.
QA: AEC 862

865. Agricultural Benefit-Cost Analysis
Spring. 3(3-0)
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 882

891. Topics in Agricultural Economics (MTC)
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.

898. 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 889

899. Master's Thesis Research
Fall, Spring, Summer. 1 to 6 credits. A student may earn a maximum of 99 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.
Economic theory of environmental change and control. Market and non-market allocation mechanisms. Temporal issues of conservation and growth. Contemporary issues in research and policy.
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 the colleges of Agriculture and Natural Resources, Business, and Social Science.
Topics such as international agricultural development, environmental economics, and trade policy.

992. Seminar in Agricultural Economics
Fall, Spring, Summer. 1 to 3 credits. A student may earn a maximum of 3 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
College of Engineering

152. Food and Agricultural Engineering
Spring. 1(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

336. Principles of Agricultural Machines
Fall. 3(3-0)
P: MSM 211, CE 321 or CHE 311 or ME 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 atomization. Machinery management.
QP: MMM 211, CE 321, ME 332, CHE 340 QA: AE 374

338. Principles of Food Processing Equipment
Spring. 3(3-0)
P: CE 321 or CHE 311 or ME 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: MMM 211, CE 321, ME 332, CHE 340 QA: AE 374

353. Engineering Principles of the Plant Environment
Fall. 3(3-0)
P: BOT 105 or BS 110; CEM 141, MTH 235, ME 201. R: Open only to Engineering majors.
Analysis of the soil-plant-atmosphere continuum. Thermodynamics effects on plant environment: water, soil heat flow, radiation, and soil water movement.
QP: CEM 141, MTH 310, ME 311, BOT 205, BS 212 QA: AE 353

356. Electric Power and Control
Spring. 3(2-2)
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 288, EE 345, EE 300 QA: AE 356

430. Power and Control Hydraulics
Spring. 3(2-2)
P: CE 321 or CHE 311 or ME 332. R: Open only to majors in College of Engineering.
Hydraulic fluid properties. Pump and motor performance parameters. Control valves and hydraulic circuitry components. Analysis and design of hydraulic systems.
QP: CE 321, CHE 340, ME 332 QA: AE 493

438. Design of Machinery Structures
Fall. 3(3-0)
P: MSM 306; AE 336 or AE 338. R: Open only to majors in College of Engineering. Not open to students with credit in ME 471.
Design of structural components and systems in machines. Tension, compression, torsion, bending and combined loadings. Joint connections.
QP: MMM 211 QA: AE 461

481. Agricultural and Small Watershed Hydrology
Spring. 4(5-0)
P: CPS 130 or CPS 131; CE 321 or CHE 311 or ME 332, AE 353 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 336 or AE 353 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 495

488. Agricultural Engineering Design Project
Spring. 3(0-6)
P: AE 486. R: Open only to seniors in College of Engineering.
Individual or team design project selected in AE 486. Information expansion, 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 ME 391 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 480

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 ME 391 or MTH 235. R: Open only to College of Engineering majors. Approval of department.
Special topics in agricultural engineering.
QP: AE 152, ME 391, MTH 310 QA: AE 490