12. American Agricultural Development and the Land-Grant System Fall, 3(3-0) R: Open only to freshmen.

A historical overview of the evolution of American agricultural development and the land-grant system, relationship between federal legislation and agrarian institutions such as farm organizations and land-grant colleges.

13. Agricultural and Natural Resources Communications Campaigns Fall, Spring, Summer, 3(3-0)

Open only to juniors or seniors in the College of Agriculture and Natural Resources or College of Communication Arts and Sciences.

Planning and execution of agricultural and natural resource communication campaigns. Emphasis on theories, strategies and techniques using mass and targeted media channels.

14. Agricultural and Natural Resources Leadership and Education Fall, Spring, Summer, 3(3-0)

Open only to juniors or seniors.

Characteristics of leadership, group dynamics, and development of personal leadership skills. Educational methods and learning styles.

15. Independent Study Fall, Spring, Summer, 1 to 4 credits.

A student may earn a maximum of 4 credits in all enrollments for this course.

AEE 401 R: Open only to Agriscience or Agriculture and Natural Resources Communications majors. Approval of department; application required.

Individual study in areas of agriscience, extension education, or agricultural and natural resource communications.

16. Selected Topics Fall, Spring, Summer, 1 to 4 credits.

A student may earn a maximum of 4 credits in all enrollments for this course.

AEE 101 or AEE 401 R: Open only to Agriscience or Agriculture and Natural Resources Communications majors. Approval of department; application required.

Topics selected to meet student needs in agriculture and natural resource communications or agriscience.

17. Global Development through Agricultural and Extension Education Fall, 3(3-0)

Application of education theories: principles and processes in planning, conducting, and evaluating formal and informal education programs on international development.

18. Program Administration in Agricultural and Extension Education Fall, 3(3-0)

Organizational and management concepts and processes in agricultural and extension education.

19. Instructional Strategies in Agricultural and Extension Education Spring, 3(3-0)


20. Communication Strategies in Agricultural and Extension Education Fall, 3(3-0)

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.

21. 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.

22. Program Planning and Evaluation in Agricultural and Extension Education Spring of odd-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.

23. 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.

24. Education Through Extension Fall, 3(3-0)

Function, organization, and operation of extension education programs.

25. Principles and Philosophies of Agriscience Education Summer, 3(3-0)

Principles and philosophies for analyzing and developing agriscience education courses, curricula, and programs.

26. 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.

27. 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.

28. Selected Topics in Agricultural and Extension Education Fall, Spring, Summer, 1 to 5 credits.

A student may earn a maximum of 5 credits in all enrollments for this course.

AEE 101 or AEE 211 or AEE 821 R: Open only to graduate students in Agriculture and Extension Education.

Contemporary issues and problems in agricultural and extension education.

29. 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 topics in agricultural and extension education.

30. 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.

31. 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.

32. Master's Thesis Research Fall, Spring, Summer, 1 to 24 credits.

A student may earn a maximum of 24 credits in all enrollments for this course.

R: Open only to master's degree students in Agricultural and Extension Education.

33. Doctoral Dissertation Research Fall, Spring, Summer, 1 to 24 credits.

A student may earn a maximum of 24 credits in all enrollments for this course.

R: Open only to Ph.D. students in Agricultural and Extension Education.

AGRICULTURAL ECONOMICS AEC

Department of Agricultural Economics
College of Agriculture and Natural Resources

Agricultural Research Systems in Developing Countries Spring, 3(3-0) Interdepartmental with Agriculture and Natural Resources, Animal Science, and Crop and Soil Sciences. Administered by Agriculture and Natural Resources.

R: Open only to seniors and graduate students in the College of Agriculture and Natural Resources.

Planning, organizing, and managing agricultural research systems. Problems and alternative reforms to improve research productivity. Adapting new agricultural technology in developing countries.
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 organizations.

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.

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.

820. Econometrics I

821. Econometrics II

822. Econometrics III

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.

831. Food Marketing Management
Fall. 3(3-0) Interdepartmental with Marketing and Logistics. Administered by Marketing and Logistics. P: ML 805 or approval of department. R: Open only to graduate students in Business or approval of department. Marketing management decisions in food firms. Consumer orientation, computer technologies, food system cost reduction, global opportunities, environmental and social issues.

832. Environmental and Natural Resource Law
Fall. 3(3-0) Interdepartmental with Resource Development, Forestry, Crop and Soil Sciences, and Geography. Administered by Resource Development. P: RD 430. Origin and development of environmental law. Theories of power, jurisdiction, sovereignty, property interests, pollution, and other bases for legal controls of natural resources. Common law and constitutional limitations on governmental power.

835. Introductory Econometrics
Summer. 3(3-0) P: STT 460. Estimation and interpretation of multiple regression models and their modifications when usual assumptions are not valid. Applications focus on problems faced by agricultural economists.

837. Water Law
Spring. 3(3-0) Interdepartmental with Resource Development and Forestry. Administered by Resource Development. P: RD 430. Legal principles applicable to surface water and groundwater, private and public water rights, and controls over water resources. Cases, statutes, and administrative procedures.

838. Land Use Law

841. Organization and Performance of Agricultural Markets
Spring. 3(3-0) P: 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.

845. Commodity Market Analysis

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.

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.

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.
Agricultural Engineering

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

102. Agricultural Climatology
Fall of even-numbered years. 3(3-0) Interdepartmental with Geography. Administered by Geography.
R: MTH 111. R: Open only to freshmen and sophomores.
Relationships between climate and agriculture in resource assessment, water budget analysis, meteorological hazards, pests, crop-yield modeling, and impacts of global climate change.

460. Resource and Environmental Economics
R: RD 201, EC 201. R: Not open to freshmen and sophomores.

802. Computational Methods in Food and Agricultural Engineering
Fall of odd-numbered years. 3(3-0)
P: MSM 809. R: Open only to graduate students in College of Engineering.

809. Finite Element Method
Fall. 3(3-0) Interdepartmental with Materials Science and Mechanics, Civil Engineering, and Mechanical Engineering. Administered by Materials Science and Mechanics.
R: Approval of department.
Theory and application of the finite element method to the solution of continuum type problems in heat transfer, fluid mechanics, and stress analysis.

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

815. Instrumentation for Food and Agricultural Engineering
Fall. 3(3-0)
R: Open only to graduate students in College of Engineering.
Theory and techniques of measuring temperature, pressure, flow, humidity, and moisture in biological materials.

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.

857. Rheological Methods in Food Processing Engineering
Fall. 3(3-0) Interdepartmental with Food Science.
Definition, analysis, and measurement of rheological properties to describe the steady shear, dynamic, viscoelastic, extensional, and solid behavior of biological materials. Industrial applications of rheological methods with emphasis on fluid and semi-solid foods.

859. Dimensional Analysis and Similitude Modeling
Fall of odd-numbered years. 3(2-2)
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.

880. Irrigation and Water Management Engineering
Spring of even-numbered years. 3(3-0)
P: AE 481, CB 321.
Design and management of systems for supplemental irrigation. Water supply and transport. Economic and engineering optimization of irrigation design.

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.

891. 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.

892. 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.

893. Master's Thesis Research
Fall, Spring, Summer. 1 to 10 credits. A student may earn a maximum of 10 credits in all enrollments for this course.
R: Open only to graduate students in Agricultural Engineering.

899. Doctoral Dissertation Research
Fall, Spring, Summer. 1 to 24 credits. A student may earn a maximum of 36 credits in all enrollments for this course.
R: Open only to graduate students in Agricultural Engineering.