**AEROSPACE STUDIES**

### All University

**041. Leadership Laboratory**
Fall, Winter, Spring. 0(0-1) Approval of department. Open only to students who are not enrolled in any other Aerospace Studies course.

Basic concepts of leadership and the role of an Air Force officer; leadership development through practical experience.

**110. Organization of the U.S. Air Force**
Fall. 1(1-1)

The doctrine and mission of the U.S. Air Force; includes its history, organization, and how it is structured for mission accomplishment. Comparison of armed services mission relationships.

**111. U.S. Strategic Offense and Defensive Forces**
Winter. 1(1-1)

Comparison of the missions and functions of specific Air Force commands, including employment of contemporary aerospace equipment and systems, as well as naval strategic offensive forces and army ABM systems.

**112. U.S. General Purpose Forces**
Spring. 1(1-1)

Tactical air forces. The mission, organization and function of the Air Force support commands and separate operating agencies as well as forces of other military branches.

**210. The Development and Employment of Aerospace Forces**
Fall. 1(1-1)

Development of flight from man's first efforts to the present. Employment of aerospace forces in war and peace.

**211. The Development and Employment of Aerospace Forces**
Winter. 1(1-1)

Continuation of A S 210.

**212. The Development and Employment of Aerospace Forces**
Spring. 1(1-1)

Continuation of A S 211.

**320. U.S. Air Force Communication and Management**
Fall. 3(3-1)

Application of communication and management skills for Air Force officers.

Winter. 3(3-1)

Leadership theory, functions, and practices. Applications of leadership concepts by junior officers.

**322. U.S. Air Force Management and Leadership**
Spring. 3(3-1)

Traditional Air Force management functions and current practices. Emphasizes need for leadership and professionalism in modern officer corps.

**420. The Military and American Society**
Fall. 3(3-1)

Role of the professional officer in a democratic society; socialization process within the Armed Services; political economic and social constraints upon the national defense structure.

**421. Strategy and the Management of Conflict**
Winter. 3(3-1)

The formation and implementation of defense policy and strategy. The bureaucratic interplay and impact of nuclear technology. An investigation of limited and insurgency warfare.

**422. National Defense Policy and Military Justice**
Spring. 3(3-1)

Broad range of American civil-military relations and the environmental context in which defense policy is formulated. Military justice and the laws of war.

**499. Independent Study**
Fall, Winter, Spring, Summer. 1 to 3 credits. May enroll for a maximum of 6 credits. Juniors and approval of instructor. Investigation of an aspect of aerospace activities of specific interest to the student and a faculty member.

---

### AFRICAN LANGUAGES

See Linguistics and Germanic, Slavic, Asian and African Languages.

### AGRICULTURAL ECONOMICS

**College of Agriculture and Natural Resources**

**805. Agricultural Production Economics I**
Fall. 4(4-0) PAM 340 or EC 325


**809. Institutions Behavior and Performance**
Fall. 3(3-0) Approval of department.


**810. Economics of Public Choice**
Winter. 3(3-0) Approval of department. Interdepartmental with the department of Resource Development and Economics.

Economics of alternative institutions for collective action. Emphasis on property rights and natural resources. Public goods, externalities, non-marginal change, commonwealth, income and power distribution, grants, welfare criteria and market failure.

**811. Public Program Analysis**
Spring, Summer of odd-numbered years. 3(3-0) EC 324 or approval of department. Interdepartmental with the departments of Economics and Resource Development.

Application of benefit-cost analysis to public programs of resources development. Issues and case studies in budgeting, investment criteria, pricing, externalities, and coordination.

**830. Data Generation and Analysis**
Winter. 4(4-0) STT 421

Organization of information systems in relation to economics of information. Use of published data and samples. Index numbers, regression, hypothesis testing and decision making. Emphasis on social science applications.

**831. Food Marketing Management**
Fall, Spring. 4(4-0) May enroll for a maximum of 6 credits. Interdepartmental with and administered by the Department of Marketing and Transportation Administration.

Food industry adjustments to changing social, economic and internal company environment. Managerial principles and techniques applied to food processing and distribution. Student interaction with industry, labor and government representatives.

**833. Mathematical Programming**
Spring. 3(3-0) EC 800 or EC 812A, MTH 334. Interdepartmental with the departments of Economics, and Statistics and Probability.

Linear programming. Theory of linear economic models. Topics in nonlinear programming.

**835. Introduction to Econometrics**
Fall, Spring, Summer. 3(3-0) EC 335, STT 492. Interdepartmental with and administered by the Department of Economics.


**837. Applied Operations Research I**
Spring. 4(4-0) MTH 113 or MTH 228. Approval of department.

Use and interpretation of operations research techniques for problems encountered by agricultural economists. Emphasis on linear programming and its variations such as transportation models, network analysis, spatial equilibrium models.

**838. Applied Operations Research II**
Summer. 3(2-0) MTH 113 or MTH 228, STT 422. Approval of department.

Use and interpretation of operations research techniques for problems encountered by agricultural economists. Emphasis on techniques such as Markov processes, dynamic programming, queuing, Monte-Carlo techniques, elementary simulations.

**841. Industrial Organization of Agricultural Markets**
Fall. 3(3-0) Approval of department.


**843. Commodity Market Analysis**
Winter. 3(3-0) STT 422, EC 325

Economic forecasting in agricultural commodity markets, short run and long run. Futures markets, hedging, speculation. Plant location and size. Selected topics. Emphasis on techniques of use to farm manager.
851. Advanced Farm Management
Summer. 3-2-2 FSM 430 or approval of department.
Emphasizes identification, analysis, and methods of solving problems of farm organization and operation; new technology, specialization and scale. Farm case studies, role-playing, and farm business simulation.

860. Rural Welfare and Development Policy
Spring. 3-3-0 Approval of department.

861. Agricultural Trade Policies
Fall of odd-numbered years, Summer of even-numbered years. 3-3-0 EC 425 or approval of department. International trade in agricultural products, areas of competition, changes in comparative advantage, interrelationships of national and international policy regional groupings, trade and economic development, current policy proposals.

862. Agriculture in Economic Development
Winter. 3-3-0 PAM 462 or approval of department. Agricultural and industrial sector interactions in the development process. Theories and models of the agricultural development process. Transformation of agriculture in less-developed countries.

865. Rural Development Administration
Winter. 3-3-0 Approval of department. Concepts and principles of development administration and their application in the analysis of the processes and structures through which rural development activities are formulated and implemented in less developed countries.

868. Data Collection in Developing Countries
Spring of even-numbered years. 3-3-0 AEC 530 or approval of department. Principles for conducting household/village level studies of production and marketing in developing countries. Preparing research proposals, methodology for data collection, processing and analysis. Field research administration.

876. Statistical Inference in Economics I
Fall. 3-3-0 EC 812A or EC 801; STT 443 or STT 863; or approval of department. Interdepartmental with the departments of Economics, and Statistics and Probability. Administered by the Department of Economics.

877. Statistical Inference in Economics II
Winter. 3-3-0 EC 876 or approval of department. Interdepartmental with the departments of Economics, and Statistics and Probability. Administered by the Department of Economics.

882. Independent and Supervised Study
Fall, Winter, Spring. 1 to 12 credits. May enroll for a maximum of 12 credits. Approval of department.
Arranged seminars initiated by faculty or students; supervised readings, individual study of special problems.

962. Development Planning and Agricultural Sector Analysis
Spring. 3-3-0 AEC 862: one year of graduate study in agricultural economics or economics or approval of department.

972. Methodological Approaches to Research
Fall of even-numbered years, Summer of odd-numbered years. 3-3-0 Two terms of graduate study in social science or approval of department. Interdepartmental with the Department of Economics.
Selection, planning and conduct of research. Alternative research approaches. Role of theory, beliefs and valuation. Critical appraisal of research studies.

990C. Mathematical Economics and Econometrics Workshop
Fall, Winter, Spring. 2 to 16 credits. EC 812A, EC 832, or approval of department. Interdepartmental with and administered by the Department of Economics.
Critical evaluation of research reports by staff and other students. Students writing doctoral dissertations in the appropriate areas are encouraged to participate in workshop and may do so while registered for AEC 990.

999. Doctoral Dissertation Research
Fall, Winter, Spring, Summer. Variable credit. Approval of department.

Food Systems Economics and Management

200. Introduction to Food Systems Management
Fall. 4-4-0
Organization of modern industrialized food production and distribution systems. Problems faced by managers of firms in food systems. Application of economic and management principles in the solution of these problems.

330. Food Production Management
Fall. 3-3-0
Description and analysis of problems faced by managers of input supply, farm, and packing and handling firms. Emphasis on planning, organization, adjustment to technological change, growth and personnel management.

335. Food Processing and Distribution Management
Winter. 3-3-0 FSM 206 or MTA 300.
Interdepartmental with and administered by the Department of Marketing and Transportation Administration.
Analysis of problems faced in the food processing and distribution system. Includes functional interrelationships, consumer orientation and future development.

370. Applied Statistics
Winter. 3-3-0 Students may not receive credit in both FSM 370 and AEC 830. One course in statistics, one course in food systems economics and management or public affairs management. Interdepartmental with and administered by Public Affairs Management.
Interpretation and use of statistical results in decision making. Sampling, index numbers, tabular analysis, trend estimation, regression models, decision theory.
412. Financing the Food System
Spring. 3(3-0) FSM 200 or EC 201.
Capital sources and requirements in the food system. Sources and terms of credit. Credit instruments. Interest rates. Credit policy issues. Principles of financial management and real estate appraisal.

417. Land Economics
Fall, Spring. 4(4-0) Interdepartmental with Public Affairs Management and the departments of Resource Development, and Economics. Administered by the Department of Resource Development.
Factors affecting man's economic use of land and space resources. Input-output relationships; development, investment, and enterprise location decisions. Land markets; property rights, area planning; zoning and land use controls.

421. Public Policy and the Food System
Winter. 3(3-0) FSM 200 or EC 201, PAM 320 recommended.
Policy issues identified and analyzed in relation to performance goals of society and groups within the food system. Emphasis on price and income policies and regulations affecting the food system.

430. Advanced Food Production Management
Fall. 3(3-0) FSM 200.
Management principles and techniques applied to food production firms including farms, input suppliers, packers and handlers. Emphasis on planning, growth, finance and decision processes. Case studies and gaming.

434. Managerial Economics
Spring. 3(3-0) EC 201.
Production, consumption decisions and their interrelation. Pricing of market and non-market goods. Effects of monetary and fiscal policies. Applications to problems in food system or community management.

443. Environmental Economics
Winter. 3(3-0) Juniors, or approval of department.
Emphasis on the environmental problems of coastal and inland bodies of water. Field trips, special projects.

446. Law and Social Change
Fall, Spring. 4(4-0) BOA 440 or approval of department. Interdepartmental with Food Systems Economics and Management and the departments of Resource Development, and Economics. Administered by the Department of Resource Development.
Application of public economic policy to solve regional economic problems.

457. Economic Policy Processes I
Fall. 3(3-0) PAM 201 or EC 201.
Analysis of processes by which public economic policy is established at various levels of government and the associated economic interests and pressures. Alternative processes for economic policy formulation. Case studies.
AGRICULTURAL ENGINEERING

College of Agriculture and Natural Resources

152. Introduction to Agricultural Engineering
Fall, Spring. 3(1-0) Interdepartmental with Agricultural Engineering Technology. An introduction to the agricultural engineering profession with an examination of existing problems.

352. Physical Principles of Biological Processes
Winter. 4(4-0) A E 352.
Basic scientific principles and engineering theory applied to biological systems and products.

450. Supervised Field Experience
Fall, Winter, Spring, Summer. 3 to 9 credits. May reenroll for a maximum of 12 credits. PAM juniors, approval of department. Supervised field work in federal, state, or local government or organizations dealing with government.

481. Soil and Water Conservation Engineering
Winter. 4(4-0) C E 321, A E 353.
Engineering analysis, design and construction of drainage, irrigation and erosion control systems.

482. Irrigation Design Management
Spring. 3(3-2) A E 451.
Water supply including wells, water transport, pumping and pump selection, water requirements, power supplies and irrigation equipment with emphasis on sprinkler and trickle methods and design for agricultural application.

492. Tractors and Power Transmission Systems
Winter. 4(4-0) A E 394.
Functional requirements, operational characteristics, analysis and design of tractors including power trains, hydraulics, traction, hitches, vehicle dynamics and operator comfort.

495. Fundamentals of Design
Spring. 3(3-0) Third-term junior majors or approval of department.
Problem identification, working media, models, procedures, and developing specifications. Selection of individual design problem for A E 496 and A E 497.

497. Design Project Laboratory
Fall, Winter, Spring. 1 to 4 credits. May reenroll for a maximum of 4 credits. A E 497.
Individual or team pursuit of the design project selected in A E 495. Activities include information expansion, developing alternatives, evaluation and selection, and concluding project.

809. Finite Element Method
Fall. 4(4-0) Approval of department. Interdepartmental with the Department of Metallurgy, Mechanics and Materials Science, and Civil Engineering. Administered by the Department of Metallurgy, Mechanics and Materials Science.
Theory and application of the finite element method to the solution of continuum type problems in heat transfer, fluid mechanics and stress analysis.