AGRICULTURAL ECONOMICS AEC

College of Agriculture and Natural Resources

470. *Analysis and Presentation of Agricultural Data*

Winter. 3(3-0) One course in statistics; not open to students with credit in PAM or FSM 370.

Sources, collection, reliability and presentation of data. Appraisal and use of economic indicators. Elementary methods of price analysis including trends and seasonals. Interpretation of statistical inferences regarding agricultural data.

803. *Emergence, Concepts and Setting of Agricultural Economics*

Fall. 1 to 3 credits.

Historical and institutional development of agricultural economics. Central concepts and interrelations of sub-fields. Politico-economic setting of agriculture and the role of agricultural economists.

805. *Agricultural Production Economics*

Winter. 3(3-0) FSM 401 or approval of department.

Resource allocation and efficiency. Production and efficiency in the firm, between firms, and between agriculture and other industries. Agricultural economics applications.

810. *Economics of Public Choice*

Winter. 3(3-0) Approval of department. Interdepartmental with Resource Development and Economics Departments.

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) FSM 401 or EC 324 or approval of department. Interdepartmental with the Economics and Resource Development Departments.

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

833. *Mathematical Programming*

Spring. 3(3-0) EC 800 or 812A, MTH 334. Interdepartmental with the Economics, and Statistics and Probability Departments.

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

835. *Econometrics and Price Analysis*

Fall, Spring, Summer. 3(3-0) EC 325, STT 422. Interdepartmental with and administered by the Economics Department.

Specification, estimation and interpretation of economic models. Applications to empirical problems.

841. *Advanced Agricultural Marketing*

Fall. 3(3-0) Approval of department.

Market organization and evaluation of performance. Pricing and market coordination problems. Group action in agricultural markets. Role of marketing in economic development.

849. *Consumption Analysis*

Spring. 3(3-0) Approval of department.

Analysis of factors influencing individual and group consumption patterns. Application of behavioral science concepts and findings to understanding consumer choice and economic policy issues related to consumption.

851. *Advanced Farm Management*

Winter. Summer of odd-numbered years. 3(2-2) 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, computer games and farm business simulation.

861. *Agricultural Trade Policies*

Fall of odd-numbered years; Summer of even-numbered years. 3(3-0) EC 427 or approval of department.

International trade in agricultural products, areas of competition, changes in comparative advantage, interrelationship 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 I*

Winter. 3(2-2) Approval of department. Interdepartmental with Agriculture.

Administrative concepts and their application in the analysis of the processes and structures through which agricultural and rural development activities are formulated and implemented in less developed countries.

866. *Rural Development Administration II*

Spring. 3(3-0) AG 865. Interdepartmental with Agriculture.

Comparative analysis of major cases of intensive, purposeful change in less developed countries with emphasis on economic, administrative, political and other relevant factors which help explain program or policy effectiveness.

876. *Statistical Inference in Economics I*

Fall. 3(3-0) EC 812C or 801; STT 443 or 863; or approval of department. Interdepartmental with the Economics, and Statistics and Probability Departments and administered by the Economics Department.

Review and extension of single-equation regression models. Properties of least-squares estimators under alternative specifications. Problems of analyzing non-experimental data. Errors in variables, autoregressive and heteroscedastic models.

877. *Statistical Inference in Economics II*

Winter. 3(3-0) EC 876 or approval of department. Interdepartmental with the Economics, and Statistics and Probability Departments and administered by the Economics Department.

Specification interpretation and estimation of simultaneous equation models. Nonlinear models. Bayesian approach to estimation problems. Recent developments in econometrics.

878. *Statistical Inference in Economics III*

Spring. 3(3-0) EC 877 or approval of department. Interdepartmental with the Economics, and Statistics and Probability Departments and administered by the Economics Department.

Validation and application of dynamic econometric models. Bayesian approach to estimation problems. Recent developments in econometric methods and in applied econometric research.

882. *Independent and Supervised Study*

Fall, Winter, Spring, Summer. Variable credit. May re-enroll for a maximum of 6 credits. Approval of department.

Arranged seminars initiated by faculty or students; supervised readings; individual study of special problems.

899. *Research*

Fall, Winter, Spring, Summer. Variable credit. Approval of department.

906. *Dynamic Production and Management Economics*

Spring. 3(3-0) 805 or approval of department.

Managerial processes in agriculture. The influence of management on resource allocation and efficiency in agriculture subject to imperfect knowledge of price, institutional, technological and human change.

941. *Agricultural Market Analysis*

Spring of odd-numbered years, Summer of even-numbered years. 3(3-0) 841 or approval of department.

Critical review of agricultural marketing research. Identification of current marketing problems and consideration of research approaches for the solution of these problems.

960. *Agricultural Policy in Developed Economies*

Winter. 3(3-0) FSM 421 and one year of graduate work in social science or approval of department.

Sectoral interrelationships and the impact of economic policies relating to agriculture in advanced economies.

962. *Workshop on Planning and Implementation of Agricultural Development*

Spring. 3(3-0) 862; one year of graduate study in agricultural economics or economics or approval of department.

National planning problems with special reference to interrelationships between agricultural and industrial sectors in less developed countries. Regional and agricultural sector planning. Project preparation and appraisal. Implementation. Research for planning.

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 Economics Department.

Selection, planning and conduct of research. Alternative research approaches. Role of theory, beliefs and valuations. Critical appraisal of research studies.

990C. *Mathematical Economics and Econometrics Workshop*

Fall, Winter, Spring. 3 to 16 credits. EC 812A, 832, or approval of department. Interdepartmental with and administered by the Economics Department.

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 999.

999. *Research*

Fall, Winter, Spring, Summer. Variable credit. Approval of department.

Food Systems Economics and Management — FSM

200. Introduction to Food Systems Management
Fall. 3(3-0).

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) 200 or MTA 300. Interdepartmental with and administered by the Marketing and Transportation Administration Department.

Analysis of problems faced in the food processing and distribution system. Includes functional interrelationships, consumer orientation and future development.

340. Managerial Economics
Spring. 3(3-0) One 300 level food systems economics and management or public affairs management course. Interdepartmental with and administered by Public Affairs Management.

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.

370. Applied Statistics
Winter. 3(3-0) Students may not receive credit in both FSM 370 and AEC 470. 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.

401. Production Economics and Management
(AEC 401.) Fall. Summer of even-numbered years. 4(4-0) 340 or approval of department. Interdepartmental with the Resource Development Department and Public Affairs Management.

Economic principles of production. Industry supply and factor demand analysis. Management concepts and choice criteria. Interrelationships of production and consumption decisions. Welfare economics. Examples drawn from agriculture.

412. Financing the Food System
(AEC 412.) Spring. 3(3-0) 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 the Resource Development and Economics Departments and Public Affairs Management and administered by the Resource Development Department.

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) 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.

422. Food System Managers in the Community
Spring. 3(3-0) 421, 430 or 439.

Examination of political and social issues affecting individual participants and businesses in the food sector.

430. Advanced Food Production Management
Fall. 3(3-0) 330.

Management principles asd 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.

439. Advanced Food Processing and Distribution Management
Fall. 3(3-0) 335. Interdepartmental with and administered by the Marketing and Transportation Administration Department.

Managerial principles and techniques applied to food processing and distribution. Emphasizes adjustment to changing social, economic and internal company environment. Student interaction with industry, labor and government representatives. Field trips, special projects.

443. Group Action in Marketing
(AEC 443.) Spring. 3(3-0) 200.

Characteristics, problems and strategies of cooperatives, unions, bargaining groups, trade associations and other voluntary organizations. Effects of group action on farmers, marketing firms and consumers. Legal restraints and facilitation of group action.

460. Location Analysis
Winter. 4(4-0) 417 or 401 or EC 324. Interdepartmental with the Resource Development and Economics Departments, and Public Affairs Management and administered by the Resource Development Department.

Forces affecting location decisions of firms, households and governments. Applications to agricultural, industrial, and regional developments.

462. Rural Transformation in Developing Societies
Fall. 3(3-0) PAM 201 or EC 201; PAM 260 recommended. Interdepartmental with Public Affairs Management and Agriculture.

Traditional agricultural systems and the incentive environment for economic growth in rural areas. Adjustment to technological, institutional and human change. Strategies for rapid agricultural transformation.

473. Introduction to Systems Analysis
Spring. 3(3-0) MTH 111. Interdepartmental with and administered by Public Affairs Management.

Principles of systems analysis applied to ecological, physical, economic and social phenomena. Case studies. Interpretation and design of systems models. Systems concepts in decision making.

480. Independent and Supervised Study
Fall, Winter, Spring, Summer. 1 to 9 credits. May re-enroll for a maximum of 9 credits. Approval of department.

Public Affairs Management — PAM

201. Introduction to Community Economics
Fall, Spring. 3(3-0)

Identification and analysis of problems faced by public decision makers in managing public revenues and services and governing private resource use. Impact of political and economic structures on resource use.

260. World Food, Population and Poverty
Winter. 3(3-0)

Description, analysis and alternative solutions of food, population and poverty problems, especially in relation to trade and aid programs. Special emphasis on problems of low income nations.

303. Welfare, Health and Education Policy
Fall. 3(3-0) 201 or EC 200.

Evaluation of selected welfare, health and education policies and alternatives. Role of public and private sectors. Impact of values, beliefs, costs, benefit distributions, political power and other factors on policy.

320. Economic Policy Processes I
Fall. 3(3-0) 201 or EC 200.

Analysis of processes by which public economic policy is established at various levels of government. Role of economic interests and pressures. Alternative processes for economic policy formulation. Case studies.

321. Economic Policy Processes II
Winter. 3(3-0) 320.

Continuation of 320 with emphasis on behavioral analysis and simulated participation in the process through case examples and problems.

340. Managerial Economics
Spring. 3(3-0) One 300 level food systems economics and management or public affairs management course. Interdepartmental with Food Systems Economics and Management.

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.

363. Economic Development of Tropical Africa
Spring. 3(3-0) EC 200 and 201, or 210. Interdepartmental with and administered by the Economics Department.

African economic development in historical perspective. Analysis of contemporary economic development problems faced by tropical African countries. Alternative strategies for African economic development.

370. Applied Statistics
Winter. 3(3-0) Students may not receive credit in both PAM 370 and AEC 470. One course in statistics, one course in food systems economics and management or public affairs management. Interdepartmental with Food Systems Economics and Management.

Interpretation and use of statistical results in decision making. Sampling index numbers, tabular analysis, trend estimation, regression models, decision theory.

401. Production Economics and Management
(AEC 401.) Fall. Summer of even-numbered years. 4(4-0) 340 or approval of department. Interdepartmental with the Resource Development Department and Food Systems Economics and Management and administered by Food Systems Economics and Management.

Economic principles of production. Industry supply and factor demand analysis. Management concepts and choice criteria. Interrelationships of production and consumption decisions. Wel-

fare economics. Examples drawn from agriculture.

404. Social Accounts and Community Choice

Winter. 3(3-0) 303 or approval of department.

Social accounting as a framework for problem definition and measurement of policy effectiveness. Conceptualization of social accounts. Use of selected social indicators in policy formulation and decision making.

406. Public Expenditures: Theory and Policy

Fall, Spring. 4(4-0) EC 201 or 210. Interdepartmental with and administered by the Economics Department.

Expenditure theory; objectives and rationale of government activity in the market system; efficiency criteria in government decision-making; planning-programming-budgeting systems and cost-benefit analysis.

417. Land Economics

Fall, Spring. 4(4-0) Interdepartmental with the Resource Development and Economics Departments and Food Systems Economics and Management and administered by the Resource Development Department.

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.

460. Location Analysis

Winter. 4(4-0) 417 or 401 or EC 324. Interdepartmental with the Resource Development and Economics Departments, and Food Systems Economics and Management and administered by the Resource Development Department.

Forces affecting location decisions of firms, households and governments. Applications to agricultural, industrial, and regional developments.

462. Rural Transformation in Developing Societies

(AEC 462.) Fall. 3(3-0) 201 or EC 201; PAM 260 recommended. Interdepartmental with Agriculture and Food Systems Economics and Management and administered by Food Systems Economics and Management.

Traditional agricultural systems and the incentive environment for economic growth in rural areas. Adjustment to technological, institutional and human change. Strategies for rapid agricultural transformation.

473. Introduction to Systems Analysis

Spring. 3(3-0) MTH 111. Interdepartmental with Food Systems Economics and Management.

Principles of systems analysis applied to ecological, physical, economic and social phenomena. Case studies. Interpretation and design of systems models. Systems concepts in decision making.

480. Independent and Supervised Study

Fall, Winter, Spring, Summer. 1 to 9 credits. May re-enroll for a maximum of 9 credits. Approval of department.

AGRICULTURAL ENGINEERING A E

College of Agriculture and Natural Resources

202. Physical Principles of Mechanical Processes

Fall, Spring. 3(1-4)

Theory and skills in metallurgy, heat treating, cold metal, sheet metal, plumbing, arc and oxy-acetylene welding and machine operations.

220. Engineering Principles Applied to Agriculture

Winter. 4(3-2) MTH 108.

Physical principles and their application to agricultural production, distribution and processing.

252. Introduction to Agricultural Engineering I

Fall. 1(1-0)

An introduction to the Agricultural Engineering profession with an examination of existing problems.

253. Introduction to Agricultural Engineering II

Winter. 1(1-0)

Communication techniques, library use, letter and technical report writing techniques as used in the Agricultural Engineering profession.

254. Introduction to Agricultural Engineering III

Spring. 1(1-0)

An analysis of the Agricultural Engineering profession with an examination of educational requirements for employment in various areas of the profession.

352. Physical Principles of Biological Processes

Fall. 3(3-0) MTH 215, PHY 289.

Basic scientific principles and engineering theory applied to biological systems and products.

353. Physical Principles of Plant Environment

Winter. 3(3-0) 352.

Physical processes and properties of the biosphere as related to engineering the plant environment.

354. Physical Principles of Animal Environment

Spring. 3(2-2) 352.

Interrelationship of environmental factors and physiological responses of animals for planning, design and control of optimum environmental systems.

355. Principles of Structures and Machines

Winter. 3(3-0) MMM 211.

Stress and deflection analysis of simple structures and machines. Estimation of loads and selection of materials. Course will be oriented towards applications in agricultural engineering.

402. Teaching Agricultural Mechanics

Winter, Spring. 5(2-6) Juniors.

Teaching theory and developing skills in agricultural mechanics in secondary and vocational schools. School and farm shop planning and management. Emphasis on equipment and material selection, metallurgy, metal work and welding.

416. Agricultural Structures

Fall, Spring. 4(3-2) Juniors.

Functional planning and principles of environmental control, cost estimation, structural component analysis and properties of building materials.

421. Electric Power

Fall, Spring. 4(3-2) 220.

Application of electric energy to production and living; selection, installation, operation and control of electrical equipment.

423. Principles of Processing Equipment

Winter. 3(2-2) 220.

Principles of equipment used in the processing and storage of biological products.

425. Farmstead Materials Handling

Spring. 3(2-2) Juniors.

Systems and equipment for handling grain, hay, fertilizer, water and wastes on the farm. Systems design and evaluation.

431. Principles of Irrigation, Drainage and Erosion Control

Spring. 4(3-2) SLS 210.

Use of surveying, design, construction and cost estimates of drainage, irrigation and water control systems.

432. Introduction to Meteorology

For course description, see **Interdisciplinary Courses.**

433. Introductory Meteorology Laboratory

For course description, see **Interdisciplinary Courses.**

435. Microclimatology

For course description, see **Interdisciplinary Courses.**

437. Principles of Food Engineering

Winter. 5(5-0) 220.

Principles and use of electricity, steam, refrigeration and hydraulics in food plants. Emphasis will be placed on specialized processing equipment, their design features, materials of construction and automatic control.

443. Internal Combustion Engines

Fall, Spring. 3(2-2) 220.

Introduction to spark ignition and compression ignition engines with emphasis on principles of operation, combustion, fuels, lubricants and engine performance.

444. Agricultural Production Machinery

Spring. 3(2-2) 220.

Basic principles of agricultural machines. Selection, care and operation of agricultural machinery for obtaining optimum conditions for crop production.

445. Hydraulic Power Transmission

Winter. 3(2-2) MTH 111, PHY 237.

Pressures, flows and losses in hydraulic power transmission systems. Operation and performance of pumps, valves, actuators, and complete systems found on agricultural and light industrial mobile equipment.

459. Special Problems

Fall, Winter, Spring, Summer. 1 to 5 credits. May re-enroll for a maximum of 5 credits. Approval of department.

462. Pollution Control

Winter of even-numbered years. 4(3-2) 352.

Application of biological, chemical, physical and engineering principles of pollution control to optimize the productiin and processing of food and fiber with respect to the quality of the total environment.

471. Electric Power and Control

Fall. 4(3-2) E E 345.

Electric motors, controls and circuits; switching logic, devices and circuit design.

474. Processing Biological Products

Winter of odd-numbered years. 4(3-2) 352, M E 311.

Engineering principles of unsteady-state heat transfer, heat exchangers, drying, storage and refrigeration as applied to the processing of biological products.