Descriptions - AGRICULTURAL ECONOMICS

of Courses

303. Welfare, Health and Education Policy
Fall, 3(3-0) PAM 201 or EC 200. Evaluation of selected welfare, health, and education policies and alternatives. Role of public and private sector. Impact of values, beliefs, costs, benefit distributions, political power and other factors on policy.

320. 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. Role of economic interests and pressures. Alternative processes for economic policy formulation. Case studies.

321. Economic Policy Processes II
Winter, 3(3-0) PAM 320 or approval of department. Analysis of socioeconomic forces as they affect the public decision processes for economic policy. Means of increasing effectiveness of staff persons in the decision process. Case studies.

330. Managerial Economics
Spring, 3(3-0) EC 204. 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 EC 201, or EC 210. Interdepartmental with and administered by the Department of Economics. 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 330. 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.

404. Social Accounts and Community Choice
Winter, 3(3-0) PAM 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.

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

431. Law and Social Change
Fall, Spring, 3(3-0) BOA 440. Interdepartmental with the departments of Resource Development, and Urban and Metropoli
tudies. Administered by the Department of Resource Development. Law as applied to urban and rural context of social change. A review of both formal and informal aspects of system accessibility, institutional formation, government, civil rights, and human service.

453. Women and Work: Issues and Policy Analysis
Winter, 3(3-0) PAM 201 or EC 200 or EC 201 or approval of department. Interdepartmental with the Department of Economics. Quantity and quality of labor force participation by women, current status and past trends. Issues analyzed include differential earnings and occupations of men and women, employment discrimination and labor legislation.

460. Regional Economics
Winter, 4(4-0) R D 417 or FSM 401 or EC 324. Interdepartmental with Food Systems Economics and Management and the department of Resource Development, and Economics. Administered by the Department of Resource Development. Households and governments. Applications to agricultural, industrial, and regional developments.

461. Regional Economics Laboratory
Spring, 1(0-2) R D 460 and approval of department. Interdepartmental with Food Systems Economics and Management and the departments of Economics and Resource Development. Evaluation and use of analytical models designed to solve regional economic problems.

462. Agricultural and Rural Development in Developing Nations
Fall, 3(3-0) PAM 201 or EC 201; PAM 260 recommended. Interdepartmental with Agriculture and Natural Resources, and Food Systems Economics and Management, 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) 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 receive for a maximum of 9 credits. Approval of department.

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

AGRICULTURAL ENGINEERING

College of Agriculture and Natural Resources

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

250. Introduction to Agricultural Engineering Problems
Fall, 2(1-2) MTH 214 or concurrently. Examination and solution of problems taken from typical areas of agricultural engineering.

352. Physical Principles of Biological Processes
Winter. 2(3-0) A E 352. Basic scientific principles and engineering theory applied to biological systems and products.

353. Physical Principles of Plant Environment
Fall. 3(3-0) CPS 120, MTH 310, CEM 152 or CEM 137. Physical processes and properties of the biosphere as related to engineering the plant environment.

354. Physical Principles of Animal Environment
Spring. 3(2-2) A E 352. Interrelationship of environmental factors and physiological responses of animals for planning, design and control of optimum environmental systems.

356. Electric Power and Control
Fall. 4(1-2) PHY 288. Alternating current calculations; sizing conductors of single- and three-phase loads; electric motors, their control and protection; switching logic; microprocessor applications. Examples drawn from agricultural applications.

376. Food Process Engineering
Spring. 3(2-2) A E 352, C E 321. Analysis of unit processes involved in handling, processing, and distribution of liquid and solid biological materials. Flow of liquids, heating and cooling, freezing, concentration, dehydration, and separation.
AGRICULTURAL ENGINEERING — Descriptions of Courses

394. Systems of Agricultural Machines
Fall, 3(3-0) MMM 306.
Functional requirements and operational characteristics of agricultural machines. Engineering principles of machines dealing with soil and plant materials. Aspects of agricultural machinery management and economics.

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-semester junior majors or approval of department.
Problem identification, working media, models, procedures, and developing specifications. Material of individual design problem for A E 496 and A E 497.

496. Design Project Investigation Laboratory
Fall, Winter, Summer, 2(0-1) A E 495.
Individual or team pursuit of a design project. Project log and completion of preliminary specifications.

497. Design Project Completion Laboratory
Fall, Winter, Spring, 2(0-4) A E 496.
Completion of design project including submission of final design report.

499. Master's Thesis Research
Fall, Winter, Spring, Summer. 1 to 5 credits. May reenroll for a maximum of 9 credits. Approval of department.
Individual student research and study in: agricultural machines and tractors, waste management, food processing, structures and buildings, environmental materials processing and handling, water management, meteorology, and climatology. Agricultural systems analysis.

886. Special Problems
Fall, Winter, Spring, Summer. 1 to 4 credits. May reenroll for a maximum of 9 credits. Approval of department.
Individual student research and study in: agricultural machinery and tractors, waste management, food processing, structures and buildings, environmental materials processing and handling, water management, meteorology, and climatology. Agricultural systems analysis.

152. Introduction to Agricultural Engineering
Fall, Spring, 1(1-0) Interdepartmental with the Department of Agricultural Engineering. Approval of department.
An introduction to the agricultural engineering profession with an examination of existing systems.

206. Computers and Information Processing in Agriculture and Natural Resources
Fall, Spring, 3(3-0) Approval of department.
Evaluation of the present and future role and application of electronic computers in the area of agriculture and natural resources.

208. Agricultural Engineering Technology
AET

49. Principles of Structures and Machines
Spring, 3(3-0) M M M 211, M M M 215.
Deflection analysis of machinery structures including plane frames and plate grids.

461. Design of Agricultural Structures
Fall, 3(3-0) M M M 214, M M M 215.
The design of components and connections with selected examples from agricultural machinery and buildings.

474. Processing Biological Products
Spring, 3(3-0) A E 352, M E 311 or C E M 361.
Engineering principles of unsteady-state heat transfer, heat exchangers, drying, storage and refrigeration as applied to the processing of biological products.

480. Special Problems
Fall, Winter, Spring, Summer. 1 to 5 credits. May reenroll for a maximum of 5 credits. Approval of department.
Individual student research and study in: agricultural machines and tractors, waste management, food processing, structures and environment, materials processing and handling, water management, meteorology, and agricultural systems analysis.

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

846. Advanced Power and Machinery
Spring, 3(2-2) A E 394, A E 492.
Analysis of agricultural machine components and systems. Emphasis on hydraulic power transmission, controls, and management of machinery systems.

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

AGRICULTURAL ENGINEERING — Descriptions of Courses

123. Commercial Food Processing Systems
Fall, 3(3-0) Interdepartmental with the Department of Food Science and Human Nutrition.
Processes and systems used in handling, processing and distribution of food; the need for processing systems and their influence on food quality.
239. Housing Conservation
(A E 239) Spring, 3(3-0)
Interdepartmental with the Department of Human Environment and Design.
Skills and techniques in conserving, repairing, and remodeling existing housing. Structural
components of housing and evaluation of housing structure.

243. Automotive and Recreational
(AE 243) Spring, 2(2-0)
The principles and maintenance of engines used in automobiles and recreational vehicles. Fuels,
lubricants and emission control. Basic engine design and use are developed in a manner
that requires no prior technical training.

244. Automotive and Recreational
(AE 244) Spring, 1(0-2); AET 243 or concurrently.
Laboratory experiences in engine maintenance, ignition principles and testing equipment.

258. Technical Skills
Fall, Winter, Spring. 1 to 2 credits.
May be repeated for a maximum of 10 credits. Majors or approval of department.
Selection, operation, and maintenance of physical components of electrical, mechanical,
environmental and water management systems in agriculture and natural resources industries,
including system design and component installation.

322. Systems Analysis in
Agricultural Production
Fall, 3(3-0) MTH 111 or MTH 109;
CPS 110 or CPS 121.
Simulation of processes and operations for food,
feed, fiber and energy flow in agriculture and
natural resources. Analysis of interrelationships
between physical systems.

323. Mechanical Systems in
Agriculture and Natural Resources
Winter, 4(4-0) PHY 237, PHY 257.
Phenomenological aspects of the laws of mechanics and their influence on the design of
mechanical and structural systems encountered in agriculture and natural resources.

324. Processing Systems for
Biological Products
Spring, 4(4-0) MTH 109 or MTH 111,
PHY 238.
Physical processes which influence biological products during production, handling, processing
and distribution. Mass and heat balances, fluid
flow, steam generation, psychrometrics, heat exchange, refrigeration and dehydration will be
discussed.

341. Energy in the Food System
Winter, 3(3-0) Juniors or approval of
department. Interdepartmental with Agriculture
and Natural Resources.
Energy flow in the food system. Conversion
principles and processes—solar, engines,
fertilizers, pesticides, electrical, waste heat
utilization. Environmental considerations,
economic and social implications related to
the food system. Alternatives. Conservation.

401. Teaching Agricultural
(A E 402) Spring, 3(2-3); AET 201;
AET 202 or AET 243 and AET 244; ED 327.A.
Teaching techniques in agricultural mechanics for
secondary and vocational schools. Shop planning
and management.

415. Agricultural and Natural
Resources Safety
Winter, 3(3-0) Juniors.
Principles of safety problem solving. Accident
causing and prevention; laws and regulations;
machinery, electrical, chemical, livestock, shop and
fire safety; security; and safety program development.

416. Light Structural Systems
Fall, 4(4-0) PHY 237 or approval of
department.
Functional planning of animal structures.
Properties of building materials and selecting
building components to satisfy requirements of
light structures.

421. Electrical Energy Utilization
Spring, 4(3-2) PHY 238 or approval of
department.
Efficient utilization of electrical energy; selection,
operation and control of electrical equipment.
Design of electrical systems.

433. Irrigation, Drainage and
Erosion Control Systems
Spring, 4(3-2) CSS 210 or approval of
department.
Use of surveying, design, construction and cost
estimates of drainage irrigation and water control
systems.

443. Machinery and Tractor
Systems
Fall, Spring, 4(3-2) A E 243 or
approval of department.
Characteristics of basic agricultural field
machinery. Diesel engine, fuel injection and
combustion chamber characteristics. Torque
and power transmission, tractor stability and
implement hitching.

480. Special Problems
Fall, Winter, Spring, Summer. 1 to 5
credits. May reenroll for a maximum of 5
credits. Approval of department.
Individual student research and study in:
agricultural machines and tractors, waste
management, food processing, structures and
environment, materials processing and handling,
water management, meteorology and
climatology, agricultural systems analysis.

807. Man-Machine Relationships
(A E 807) Fall, 3(3-0) Approval of
department.
Analysis of machine design, operation and
working environment in relation to human
limitations and capabilities. Analysis of procedures
used to develop maximum compatibility between
man and machine.

Building Construction

200. Dynamics of American
Housing
Fall, Winter, Spring, Summer, 3(3-0)
Impact of housing on the economic and social
well-being of America. Analysis of the residential
building industry and its problems in providing
adequate housing.

312. Structural Design
Winter, 4(4-0) PHY 237.
Consideration of structural design systems as used
in light construction.

412. Housing Utilities Design
Winter, 4(4-0) PHY 238, EGR 463 or
approval of department.
Design of and planning for mechanical and
electrical utilities in housing.

413. Residential Construction
Systems
Spring, 4(3-2) PHY 239, BC 312 or
approval of department.
Analysis of the primary construction systems
employed in the residential building industry,
especially the economic and social aspects in
meeting the housing goals of the U.S.

415. Building Materials
Spring, 4(4-0) PHY 239, BC 312 or
approval of department.
Properties of building materials pertinent to their
application and performance in service.

416. Building Costs
Fall, 4(2-4) EGR 364 or approval of
department.
Methods of cost estimating. Effects of codes and
production practices on costs.

417. Residential Finance
Winter, 4(4-0) A FA 395 or approval of
department.
Analysis of financial programs for the
construction, rehabilitation, remodeling and
purchase of homes; especially meeting the
nation's goals for low to moderate income
housing.

418. Special Problems
Fall, Winter, Spring, Summer. 1 to 3
credits. May reenroll for a maximum of 9
credits. Written approval of department.
Special problems in the areas of acquisition and
development of residential land, design,
construction technology, building materials,
finance, marketing, construction management
and land use codes and regulations.

420. Construction Management
Spring, 4(4-0) Senior majors or
approval of department.
Systems management techniques for residential
building organizations inclusive of organization
development, operations, planning, scheduling
and control, and administrative systems and
procedures.
Agriculture and Natural Resources - Descriptions of Courses

341. Energy in the Food System

350. Leadership Development for Agriculture and Natural Resources
(AG 350). Winter, Spring, 3(3-0). May reenroll for a maximum of 6 credits. Approval of department. Leadership development. Preparation for community leadership. Focus: rural development. Topics: relationships between communities and institutions; rural community development; leadership of rural organizations. Department.

389. Master's Thesis Research
Fall, Winter, Spring. Variable credit. Approval of department.

Agriculture and Natural Resources
ANR

College of Agriculture and Natural Resources

202. Soils and Man's Environment

220. Plants and Their Environment
(NR 220). Winter. 3(3-0). Interdepartmental with and administered by the Department of Forestry. Relationships between plants and fundamental climatic, edaphic, and biotic factors; structure and function of ecosystems in relation to environmental factors.

2304. Introduction to Careers in Vocational and Practical Arts Education: Agriculture and Natural Resources
(AG 124A, 124B, 124C). Fall, 2(1-2). Open only to teaching majors or minors in agriculture and natural resources. Interdepartmental with and administered by the College of Education. To assist agriculture and natural resources teachers in developing concepts pertaining to the nature and functions of persons in agriculture and natural resources occupations and development of competencies which will assist in making their students aware of these functions.

275. Exploring International Agriculture
(AG 275). Spring. 3(3-0). Exploration of overseas assignments with international agencies; potential world food actualities and potentialities; special problems of the tropics compared with those in temperate regions.

280. Selected Topics
(AG 285). Fall, Winter, Spring. Summer. 1 to 4 credits. May reenroll for a maximum of 6 credits if different topics are taken. Approval of department.

445. Pest Management II: Pesticide Chemistry and Application Systems for Plant Protection
(AG 435, AG 445). Winter. 5(3-4). Interdepartmental with and administered by the Department of Forestry. A broad overview of pesticide chemistry, efficient usage, environmental fate, legislation and application techniques.

466. Pest Management III: Biological Systems for Plant Protection
(AG 436, AG 446). Spring, 6(3-3). Interdepartmental with and administered by the Department of Forestry. Management of pests by means of natural enemies, cultural practices, biological controls, and other means of pest control.

480. Selected Topics
Fall, Winter, Spring. Summer. 1 to 4 credits. May re-enroll for a maximum of 9 credits if different topics are taken. Approval of department.

Exposition of special topics in agriculture and natural resources.