

**Descriptions—Food Science
of
Courses**

890. Special Problems in Food Science
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 Food Science. Approval of department; application required. Individual investigation of an area of food science.
QA: FSC 880

891. Selected Topics in Food Science
Fall, Spring, Summer. 1 to 4 credits. A student may earn a maximum of 6 credits in all enrollments for this course.
R: Open only to graduate students in Foods or Food Science or Human Nutrition. Topics of current interest and importance in basic and applied areas of food science.
QA: FSC 850

892. Food Science Seminar
Fall, Spring. 1(1-0) A student may earn a maximum of 4 credits in all enrollments for this course.
R: Open only to graduate students in Food Science. Critical review of literature, organization and communication of scientific data in food science.
QA: FSC 990

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 graduate students in Food Science. Approval of department. Directed research in support of Plan B master's degree requirements.

899. Master's Thesis Research
Fall, Spring, Summer. 1 to 10 credits. A student may earn a maximum of 99 credits in all enrollments for this course.
R: Open only to M.S. students in Food Science.
QA: FSC 899

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 Food Science.
QA: FSC 999

**FOOD SYSTEMS ECONOMICS
AND MANAGEMENT FSM**

**Department of Agricultural
Economics
College of Agriculture and Natural
Resources**

200. Introduction to Food Systems Management
Fall. 3(3-0)
organization and operation of the industrialized food system: agricultural production, food processing, manufacturing, wholesaling, retailing and consumption. Application of economic and management principles to firms and the overall food system.
QA: FSM 200

320. Agribusiness and Food Sales
Spring. 3(3-0)
P: FSM 200 or ML 300. R: Not open to freshmen and sophomores. Selling processes and activities within agribusiness and food firms. Principles and techniques of sales. Operation of sales organizations.
QP: FSM 200, ML 300

325. Agribusiness Labor and Personnel Management
Fall. 3(3-0)
P: FSM 200 or MGT 302 or concurrently. R: Not open to freshmen and sophomores. Labor for farms and agribusinesses: planning, recruiting, training, scheduling, motivating, supervising, and evaluating. Labor regulations, compensation, and records.
QP: FSM 200 or MGT 302

330. Farm Business Management
Spring. 3(4-0)
P: FSM 200 or MGT 302. R: Not open to freshmen. Management, planning, and control of farm production, marketing and financial activities. Problems and evaluation of alternative solutions. Economic principles, budgeting, financial statements.
QP: FSM 200 QA: FSM 330, FSM 430

412. Financial Management in the Food System
Spring. 3(3-0)
P: FSM 330, FI 311. R: Not open to freshmen and sophomores. Analysis of agricultural business performance using financial statements. Capital budgeting of durable investments. Risk. Alternative methods to control capital asset services. Financial markets and credit institutions affecting agriculture.
QP: FSM 330 QA: FSM 412, FSM 430

421. Public Policy Issues in Food and Agribusiness
Spring. 3(3-0)
P: EC 201, FSM 200. R: Not open to freshmen and sophomores. Objectives, rationale, and consequences of public policy for food and agriculture. Analysis of economic implications for food and agribusinesses, farmers, consumers, and society.
QP: EC 201, FSM 200 QA: FSM 421

429. Agribusiness Management
Spring. 3(4-0)
P: FSM 330. R: Open only to seniors and graduate students. Analysis of agribusiness management functions including planning, organizing, and controlling. Integration of production, marketing, and financial aspects of agribusiness. Solutions to agribusiness managerial problems.
QP: FSM 200

441. Commodity and Futures Marketing
Spring. 3(3-0)
P: FSM 200, EC 201; STT 200 or STT 201 or STT 315. R: Not open to freshmen and sophomores. Supply, demand and prices in commodity markets. Futures and options and their role in forward pricing. Agricultural and food markets.
QP: STT 201, EC 201, FSM 200 QA: FSM 441

443. Food Industry and Cooperative Marketing
Spring. 3(3-0)
P: FSM 200. R: Not open to freshmen and sophomores. Multiple firm and cooperative marketing methods. organization and operation of cooperatives, marketing orders, trade associations and other forms of group action in the food system.
QP: FSM 200 QA: FSM 443

462. Agricultural Development in Less Developed Countries
Fall. 3(3-0)
P: EC 201; PAM 260 recommended. R: Not open to freshmen and sophomores. Factors responsible for agricultural growth, as well as technical and institutional change. Sustainable strategies for increasing food production and rural incomes.
QP: EC 201 QA: FSM 462

490. Independent and Supervised Study
Fall, Spring, Summer. 1 to 6 credits. A student may earn a maximum of 7 credits in all enrollments for this course.
P: FSM 200; ML 335 or FSM 330. R: Open only to FSM majors. Approval of department; application required. In-depth independent study of topics and issues affecting the food system. Complementary to previous coursework, adapted to career aspirations.
QP: FSM 200, FSM 335 or FSM 330 QA: FSM 480

FORESTRY FOR

**Department of Forestry
College of Agriculture and Natural
Resources**

201. Tenets of Forestry
Fall. 1(1-0)
R: Open only to Forestry students. Completion of Tier I writing requirement. History, founding principles, and core concepts of forestry. Stewardship, conservation, professional ethics, and current forestry issues.

202. Introduction to Forestry
Fall, Spring. 3(3-0)
Historical development of forestry. Forest growth, protection, management, and products. Relationship of national and world economy and policy to forestry. Emphasis on multiple uses of forests.
QA: FOR 202

204. Forest Vegetation
Fall. 4(3-3)
Nomenclature, classification, and identification of woody plants. Tree structure as it relates to growth and ecosystem dynamics.

220. Plants and Their Environment
Fall. 3(3-0)
Relationships between plants and fundamental climatic, edaphic, and biotic factors. Structure and function of different ecosystems in relation to environmental factors.

304. Wood Technology
Fall. 4(3-2)
P: CEM 141, PHY 231. R: Not open to freshmen and sophomores. Structure and identification of wood. Physical and mechanical characteristics. Major industrial timber utilization processes including manufacture of lumber, furniture, composites, and paper.
QP: PHY 237, CEM 141, MTH 111 QA: FOR 209, FOR 430, FOR 431

306. Forest Biometry
Spring. 4(3-2)
P: MTH 116, FOR 201, FOR 204. R: Not open to freshmen and sophomores. Describing location and area of forest resources. Quantification of site, stand, and tree characteristics. Sampling and inventory. Predicting growth and yield.
QP: MTH 111, FOR 204 QA: FOR 320, FOR 420

404. Forest and Agricultural Ecology
Fall. 4(3-3) Interdepartmental with Crop and Soil Sciences.
P: CSS 210, BOT 105. Structure and function of ecosystems managed for crop and wood production. Productivity, nutrient cycling, community dynamics as affected by management intensity and natural disturbance. Dynamics of managed versus natural ecosystems.
QA: FOR 304, CSS 412

406. Silviculture
Spring. 4(3-3)
P: CSS 210, FOR 204. R: Not open to freshmen and sophomores. Ecophysiology of tree growth and reproduction. Stand structure, composition and growth. Intermediate stand treatments. Natural and artificial reproduction. Silvicultural techniques.
QP: FOR 204, CSS 210 QA: FOR 305

408. Forest Management
Fall. 4(3-2)
P: FOR 420. Management of forests for timber production in a multiple-use context. Yield projections, harvest scheduling, management prescriptions, project analysis and administration.
QP: FOR 305, FOR 455 QA: FOR 458

- 409. Forest Hydrology**
Spring of even-numbered years. 3(2-3)
Interdepartmental with Crop and Soil Sciences, and Resource Development.
P: CSS 210; MTH 116; CPS 100 or CPS 130 or CPS 131. R: Not open to freshmen and sophomores.
Science and technology of the hydrologic cycle and water resources in forest, wildland, wetland, and rural watersheds.
QP: CSS 210, MTH 108, CPS 100 or CPS 115 or CPS 112 QA: FOR 409
- 420. Forestry Field Studies**
Summer: 3 credits. Given only at W.K. Kellogg Biological Station.
P: FOR 304, FOR 306, FOR 404, FOR 406. R: Open only to juniors and seniors in College of Agriculture and Natural Resources.
Major forest management concepts. Ecology, silviculture, soils, biometry. Timber harvesting and use. Forest protection. Field trips required.
QP: FOR 209, FOR 320, FOR 305, FOR 304, FOR 204, CSS 210 QA: FOR 304, FOR 305, FOR 329, FOR 320
- 422. Woody Plant Genetics**
Fall. 3(2-2)
P: BOT 105, BOT 301, CSS 350.
Applications of plant breeding and genetic principles to improve tree species and to preserve biological diversity in forest ecosystems for human benefit.
QP: BOT 205, BOT 301, CSS 350 QA: FOR 410
- 450. Forestry in International Development**
Fall. 4(3-2) Interdepartmental with Sociology.
P: FOR 404 or FOR 464. R: Open only to seniors and graduate students.
Biophysical, social and economic factors influencing design and implementation of farm, village and community level forestry and agroforestry projects.
QA: FOR 464, FOR 474
- 460. Arboriculture**
Fall. 3(2-2)
P: BOT 105; FOR 204, or HRT 211. R: Not open to freshmen and sophomores.
Tree selection and planting to fit climatic, space and edaphic conditions. Diagnosing tree abnormalities. Cultural practices used in the care and maintenance of shade and ornamental trees. Field trip required.
QP: FOR 204, BOT 205 QA: FOR 460
- 461. Urban Forestry**
Spring. 3(3-0)
P: FOR 204 or HRT 211. R: Not open to freshmen and sophomores.
Trees in improving the urban environment. Principles of urban forest management: legal, economic, organizational, and cultural. Street tree planning and inventory systems. Utility forestry and commercial arboriculture. Field trips required.
QP: FOR 202 or HRT 211 QA: FOR 461
- 464. Natural Resource Economics and Social Science**
Fall. 3(2-2) Interdepartmental with Park and Recreation Resources, Fisheries and Wildlife, and Resource Development.
P: EC 201 or EC 202. R: Not open to freshmen and sophomores.
Application of economic and social science principles and techniques to production and consumption of natural resources. Benefit-cost analysis. Regional impact analysis. Social impact assessment.
QP: EC 201 or EC 202 QA: FOR 455
- 466. Natural Resources Planning and Policy**
Spring. 3(2-2) Interdepartmental with Fisheries and Wildlife, Park and Recreation Resources, and Resource Development.
P: FOR 408; FOR 464 or FW 434 or FW 424; FW 472 or PRR 443 or RD 415 or RD 460. R: Open only to seniors and graduate students in College of Agriculture and Natural Resources.
Scientific, environmental, social, and institutional factors affecting planning and policy-making. Focus on ecosystem-based planning and policy issues through development of a multiple-use plan. Case studies.
QP: FOR 455 or RD 417 QA: FOR 466
- 490. Independent Study in Forest and Wood Science**
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 juniors and seniors. Approval of department.
Special problems course for students qualified for advanced study in some phase of forestry or wood science
QA: FOR 465
- 801. Forestry Research**
Fall. 1(1-0)
R: Open only to graduate students in Forestry.
The philosophy, nature, and procedures of research in forest science.
- 804. Forest Ecology**
Spring of odd-numbered years. 3(3-0)
P: FOR 404.
Forest productivity, competition and succession. Wildfire, nutrient cycling, timber management. Biodiversity. Gap, wave, and landscape regeneration. Theories and methods of analysis.
QP: FOR 304 QA: FOR 804
- 809. Advanced Wood Technology**
Spring of odd-numbered years. 3(2-2)
R: Open only to graduate students in College of Agriculture and Natural Resources.
Mechanical and physical properties of wood. Sorption, swelling, elasticity, and anisotropy. Composite technology and industry practices.
- 824. Forest Soils**
Fall of odd-numbered years. 3(2-2)
Evaluation and inventory of forest soils and landscape ecosystems. Physical, water, biological, and chemical processes. Nutrient cycling, diagnosis, and fertilization. Variability, geography, and landscape ecology.
- 835. Silviculture**
Fall of even-numbered years. 3(3-0)
R: Open only to graduate students in Forestry, Fisheries and Wildlife, Botany and Plant Pathology, and Resource Development.
Ecological, genetic, physiological, and societal impacts of silvicultural practices. Current problems in stand management and forest regeneration in temperate and tropical zones.
QA: FOR 835
- 845. Forest Resource Policy**
Spring of odd-numbered years. 3(3-0)
Models, processes and analytical methods. Interaction of markets, government, and citizens in policy issue development, formulation, implementation and evaluation.
QA: FOR 850
- 864. Agroforestry Systems**
Spring of odd-numbered years. 3(3-0)
R: Open only to graduate students majors in Botany and Plant Pathology, Crop and Soil Sciences, Forestry, and Horticulture.
Biophysical and ecological aspects of agroecology and agroforestry. Nutrient cycling and the soil, root, tree and crop interface.
- 866. Economics of Renewable Resources**
Spring of even-numbered years. 3(3-0)
Interdepartmental with Resource Development.
P: AEC 821.
Applications of economic theory and analysis to renewable natural resources problems. Focus on renewable resource interactions, including multiple-use forestry and agroforestry.
- 890. Special Problems**
Fall, Spring, Summer. 1 to 5 credits. A student may earn a maximum of 7 credits in all enrollments for this course.
R: Approval of department; application required.
Advanced individual study in an area of forestry.
QA: FOR 807
- 899. Master's Thesis Research**
Fall, Spring, Summer. 1 to 10 credits. A student may earn a maximum of 99 credits in all enrollments for this course.
QA: FOR 899
- 910. Modeling for Natural Resources Management**
Spring of odd-numbered years. 3(2-2)
Interdepartmental with Resource Development.
P: AEC 892B.
Simulation and optimization models for developing resource management strategies. Decision and policy analysis.
QP: AEC 837 QA: R D 960
- 930. Advanced Forest Genetics**
Fall of odd-numbered years. 2(1-2) Interdepartmental with Horticulture, and Crop and Soil Sciences.
P: HRT 819 or HRT 836.
Applications of genetics, plant breeding, and biotechnology to the improvement, and preservation of diversity, of tree species.
- 976. Multivariate Methods in Agriculture and Natural Resources**
Spring. 4(4-0)
P: STT 422, MTH 314. R: Open only to graduate students in the College of Agriculture and Natural Resources and in the Interdepartmental Graduate Specializations in Ecology and Evolutionary Biology. Application of multivariate methods to research problems. Hotelling's T-test, profile analysis, discriminant analysis, canonical correlation, principal components, principal coordinates, correspondence analysis, and cluster analysis.
QP: STT 423, MTH 334 QA: FOR 976
- 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 Forestry.
QA: FOR 999

FRENCH **FRN**
**Department of Romance and
Classical Languages
College of Arts and Letters**

- 101. Elementary French I**
Fall, Spring. 4(4-1)
R: No previous experience in French or designated score on French placement test. Not open to students with credit in FRN 150.
Practice in using and understanding French to develop listening, speaking, reading, and writing skills. Pronunciation, grammar, vocabulary, and cultural topics.
QA: FRN 101, FRN 102
- 102. Elementary French II**
Fall, Spring. 4(4-1)
P: FRN 101 or designated score on French placement test. Not open to students with credit in FRN 150.
Further practice in using and understanding French to develop listening, speaking, reading, and writing skills. Pronunciation, grammar, vocabulary, and cultural topics.
QP: FRN 102 QA: FRN 102, FRN 103
- 150. Review of Elementary French**
Fall, Spring. 3(3-1)
R: Open to students with high school credit in French and designated score on French placement test. Not open to students with credit in FRN 101 or FRN 102.
Review of college first-year French for students who had the language in high school and who need to strengthen communication skills, vocabulary, grammar, and pronunciation before study at the 200 level.
QA: FRN 190