CROP AND SOIL SCIENCES CSS

College of Agriculture and Natural Resources

101. Crop Science

Fall. 3(3-0)

Principles of identification, adaptation, management, and utilization of field crops for food and fiber. Fundamentals of crop management, breeding, weed control, crop quality, and tropical crops in world agriculture.

202. Soil and Our Environment

Spring. 4(3-2) Not open to students with credit in CSS 210. Non-majors only.

Role of soil in growing plants, water use and conservation, nutrient cycling, fertilizers, environmental quality, animal health, anthropology and food-population dilemma.

210. Fundamentals of Soil Science

Fall, Winter. 5(3-4) CEM 130. Not open to students with credit in CSS 202.

Nature of soils and their relation to plant growth, water regimes, nutrient cycling, erosion, environmental quality, plant composition, animal health and world food production.

250. Plant and Animal Genetics

Winter. 5(5-0) B S 211.

Fundamentals of modern genetics with particular focus on problems and application in agriculture and natural resources.

301. Forage Crops

Fall. 3(2-2) Sophomores.

Distribution, morphology, identification, physiology, management and utilization of forage crops for hay silage, and pasture for livestock and for soil improvement and conservation.

331. Soil Management

Winter. 4(4-0) CSS 210.

Management of soils, drainage, and irrigation, organic matter, tillage, rotation, conservation practices, soil reaction, lime, fertilizers, and micronutrients. Soil management vs. soil conservation. Special study in general crops, horticultural crops, greenhouse crops, turf and organic soils.

380. Ecology and Physiology of Agricultural Plants

Spring. 3(3-0) FOR 220 or BOT 301.

Interrelationships of physiological processes and environmental manipulation for higher yield of agricultural plants.

390. Soil Conservation and Land Use

Winter. 3(3-0) CSS 210.

Concepts of soil erosion by water and wind and methods for soil conservation including control of erosion and sedimentation. Interpretation of soil properties for land use decisions.

402. Principles of Weed Control in Field Crops

Fall. 4(3-2) CEM 132, BOT 301.

Principles underlying weed control practices for agronomic crops. Factors involved in mechanical, chemical and biological control and basic physiological aspects of herbicide applications.

406. Crop Improvement and Seed Production

Winter. 4(3-2)

Practical methods of crop improvement, seed production, storing, cleaning, packing, and distribution, seed certification of small grains, legumes, corn, beans, potatoes, visits to seed agencies and seed farms.

408. Principles of Plant Breeding

Winter. 4(3-2) CSS 250. Interdepartmental with the Department of Horticulture.

Application of genetics and other sciences to breeding and improvement of agronomic and horticultural crops.

411. Special Problems in Agronomy

Fall, Winter, Spring, Summer. 1 to 4 credits. May reenroll for a maximum of 6 credits if different problem is taken.

Special crop problems in production, physiology, ecology, weed control, turfgrass management, storage, preservation and seed studies. Special soils problems in fertility, geography, classification, conservation, management, organic soils and turfgrass soils.

412. Topics in Agronomy

Fall, Winter, Spring, Summer. 2(2-0) or 3(3-0) May reenroll for a maximum of 9 credits if different topics are taken. Approval of department.

Topics will be selected from crop production, crop physiology, turfgrass management, organic soils, turfgrass soils, soil fertility and genetic analysis.

415. Turfgrass Management

Spring. 3(2-2)

Adaptation characteristics and utilization of turf grasses, management principles and physiological bases for the establishment and maintenance of turf for lawns, athletic fields, golf courses, cemeteries, parks, highways and airfields.

420. Seminar

Winter. 1(1-0) May reenroll for a maximum of 4 credits.

424. Forest Soils

Spring. 3(2-3) CSS 210; Juniors or approval of department. Forestry majors: FOR 305, FOR 402, FOR 425, FOR 429 concurrently. Interdepartmental with and administered by the Department of Forestry.

Interrelationships of forest site and the growth of trees. Properties, classification, inventory, productivity and management of forest soils. Effects of silvicultural and forest management practices on the soil.

425. Forest Soils Laboratory

Spring. 1(0-3) CSS 210; FOR 305, FOR 402, FOR 424, FOR 429 concurrently. Interdepartmental with and administered by the Department of Forestry.

Exercises and field trips relating to properties, classification, inventory, productivity and management of forest soils. Extended field trips required.

430. Soil Fertility and Fertilizers

Spring. 5(4-1) CSS 210.

Major, secondary and micronutrient elements of soils. Role of colloids in ion fixation and exchange, acidity, liming, fertilizer application, technology and soil-plant diagnosis.

440. Soil Biophysics

Winter. 3(3-0) CSS 210 and BOT 301; CSS 380 recommended.

Salient features of soil physical and biological properties related to plant growth, principles and applications. Emphasis on root responses to the environment. Bioenergetics of the root-soil interface.

470. Soil Classification

Fall, Spring, Summer of odd-numbered years. 4(0-8) CSS 210 or approval of department.

Determination of soil properties by field examination of soils. Classification of soils. Preparation of land use report based upon soil maps of assigned areas. Field trips required.

480. Soil Geography and Land Use of North America

Spring. 3(2-1) CSS 210 or approval of department.

Properties, geography and dominant land use of the major soils of North America.

485. Seed Science

Spring. 3(3-2) Approval of department.

Morphological and physiological changes during seed formation, development, maturation and germination. Practical and biological aspects of seed drying. Storage, deterioration, dormancy and quality. Current problems and research in seed science.

801. Crop Ecology

Winter of even-numbered years. 2(2-0) Approval of department.

World climates in relation to crops and cropping systems. Limiting environmental factors for crop distribution and productivity. Physiological basis of stress injury and resistance for chilling, freezing, flooding, drought and salinity.

805. Herbicidal Action and Metabolism

Spring of odd-numbered years. 3(3-0) CSS 402; BOT 415 or concurrently.

A study of the properties and characteristics of herbicides, the fundamental processes involved in the physiological action, behavior, and metabolism of herbicides.

811. Advanced Problems

Fall, Winter, Spring, Summer. 1 to 6 credits. May reenroll for a maximum of 8 credits for either a M.S. or Ph.D. degree program, or a maximum of 14 credits for both degree programs, if different topics are taken. Approval of department.

Field crop problems in management, physiology, ecology, breeding, turfgrass culture, weed control, nutritional quality, tropical crops, crop extension and seed studies. Soils problems in biophysics, chemistry, classification, conservation, fertility, geography, management microbiology, biochemistry, micronutrients, micropedology, mineralogy, organic soils and physics.

812. Selected Topics

Fall, Winter, Spring, Summer. 2(2-0) or 3(3-0) May reenroll for a maximum of 9 credits if different topics are taken. Approval of department.

Topics will be selected from physiology of herbicides, micronutrients, advanced soil physics, advanced soil chemistry.

820. Seminar

Winter, Spring. 1(1-0) May reenroll for a maximum of 3 credits.

Studies and presentation of research in crop and soil sciences.

825. *Clay Mineralogy*

Winter. 4(3-4) CSS 840, CSS 850 or approval of department. Interdepartmental with and administered by the Department of Geology.

Structures and properties of clays; their origins, occurrence, and utilization. Methods of studying clays including x-ray diffraction, differential thermal analysis, infrared absorption and other chemical and physical techniques.

830. *Physiological Genetics*

Winter. 3(3-0) Approval of department. Interdepartmental with and administered by the Department of Forestry.

Physiological bases for genetic variation in higher plants including adaptive physiology, quantitative genetics, growth correlations, biochemical genetics, hybrid physiology, and genecology.

831. *World Food Crops*

Spring of odd-numbered years. 3(3-0)

World food crop production and related systems of agriculture which provide this resource. The impact of modern discoveries and opportunities for change.

833. *Soil Fertility and Plant Nutrition*

Winter. 3(3-0) CSS 430 or approval of department.

Fundamental concepts in soil fertility and mineral nutriton of plants; fate of nutrients applied to soils, nutrient uptake, translocation and utilization by plants; principles of laboratory, greenhouse and field research methods.

840. *Soil Physics*

Fall. 5(3-6) CSS 430, CEM 162 or approval of department.

Physical properties of soil (texture, structure, consistency, aeration, water, temperature, etc.), their quantitative measurement, and relation to plant growth, and agronomic and engineering practices.

842. *Advanced Soil Microbiology*

Fall of odd-numbered years. 3(3-0) MPH 425 or approval of department. Interdepartmental with and administered by the Department of Microbiology and Public Health.

Biochemistry, biology, and community ecology of microorganisms indigenous to soil. Emphasis on current research problems.

843. *Soil Microbiology Laboratory*

Fall of odd-numbered years. 2(0-6) MPH 842 concurrently or approval of department. Interdepartmental with and administered by the Department of Microbiology and Public Health.

Fundamental techniques of dealing with microorganisms indigenous to soil. Metabolic activity of microorganisms. Interaction between microorganisms and plants.

850. *Soil Chemistry*

Winter. 5(3-6) CSS 430; CEM 162, CEM 383; or approval of department.

Chemistry of mineral weathering and soil formation, ion activities, ionic exchange and equilibrium reactions, soil pH, specific elements and their chemical analysis, and availability of nutrients to plants.

851. *Developmental Genetics and Plant Breeding*

Fall of odd-numbered years. 4(3-1) One course each in genetics, statistics and plant breeding.

Plant breeding in relation to genetics of growth and development. Problem sets in statistical treatment of plant breeding data.

860. *Soil Biochemistry*

Spring of even-numbered years. 4 credits. CSS 850; MPH 442.

Biochemical transformations of mineral nutrients and of natural and exotic organic materials in soils, considered in relation to chemical, physical and ecological systems in the complex soil environment.

870. *Origin and Classification of Soils*

Winter. 4(3-2) CSS 470, CSS 840, or approval of department.

Genesis, morphology and classification of major soils of the world. Relationships among soils in natural and cultural landscapes. How soil properties affect their use, management and conservation. Land classifications for various purposes.

899. *Master's Thesis Research*

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

920. *Design and Analysis of Agronomic Experiments*

Spring. 3(3-0) STT 423 or approval of department.

Constructing and analyzing designs for experimental investigations in the biological sciences.

951. *Cytogenetics in Plant Breeding*

Winter of odd-numbered years. 3(3-0) BOT 427, BOT 828, or approval of department. Interdepartmental with the Department of Horticulture.

Application of cytogenetic principles to plant breeding. Significance of recombination, role of induced mutations, polyploid, chromosome substitution, and aneuploid analyses as they apply to the field of plant breeding.

952. *Plant Breeding Biometrics*

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

Biometrical genetics as it applies to plant breeding. Includes studies of path coefficients, partitioning of variance, and the principles of selection in a changing environment.

999. *Doctoral Dissertation Research*

Fall, Winter, Spring, Summer. Variable credit.

DAIRY SCIENCE

See Animal Science.

EARTH SCIENCE

See Geology.

ECONOMICS EC

Courses are classified as follows:
Applied Welfare Economics—410.
Labor Economics and Industrial Relations—305, 306, 455, 457.
Money and Banking—318, 330, 470.
International Economics—428.
Public Finance—406, 407, 408.
Price and Value Theory—324, 325, 426.
Income and Employment Theory—326, 451, 470.
History of Economic Thought—421, 422.
Industrial Organization and Control—444, 445.
Economic Development, Regional Studies, and Comparative Economics Systems—430, 431, 434.

200. *Introduction to Economics*

Fall, Winter, Spring, Summer. 4(4-0) Open to Freshmen. Students may begin sequence with either EC 200 or EC 201. Not open to students with credit in IDC 204.

Problem of unemployment; meaning and determination of national income; the multiplier; the accelerator; fiscal policy; deficit spending; monetary policy; banks creation of money; international aspects of the employment problems.

201. *Introduction to Economics*

Fall, Winter, Spring, Summer. 4(4-0) Open to Freshmen. Students may begin sequence with either EC 200 or EC 201. Not open to students with credit in IDC 205.

Problem of resource allocation; price determination (demand, supply), applications to agricultural policy; diminishing returns; behavior of the firm (determination of quantity of output, hiring of factors); aspects of international trade.

210. *Fundamentals of Economics*

Fall, Winter. 4(4-0) MTH 215 or MTH 228; or concurrently. Students may not earn credit in EC 210 if they have credit in either EC 200 or EC 201.

Introductory course in economic theory, employing mathematics, when useful, as a tool analysis. Covers consumer and business behavior, markets and the price system, income distribution, and elements of employment theory.

IDC. *Introduction to Latin America III*

For course description, see Interdisciplinary Courses.

251H. *Households, Firms and Markets*

Fall. 5(5-0) Honors College students.

Microeconomic theory and its applications to analysis and policy. Substitutes for EC 201, EC 324, and EC 325.

252H. *Aggregative Economics and Public Policy*

Winter. 5(5-0) Honors College students.

Theory of national income and its application to analysis and policy. Substitutes for EC 200, EC 326 and EC 327.

305. *Industrial Relations and Trade Unionism*

Fall, Winter, Spring, Summer. 4(4-0)

Development, aims, structure, and functions of labor and employer organizations. Their relation to economic, political, and legal institutions and their impact on society. Primary issues in collective bargaining.