CROP AND SOIL SCIENCES

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. 3(3-0)
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, food-population dilemma.

204. Corn and Soybean Production
Fall. 2(2-4) CSS 101, CSS 202 or CSS 210.
Topics related to increased efficiency in corn and soybean production: time of planting, irrigation scheduling, fertility, and weed, insect and disease control.

205. Navy Bean and Sugarbeet Production
Winter. 2(2-0) CSS 101, CSS 202 or CSS 210.
Navy bean and sugarbeet production and marketing in Michigan. Presentations by specialists from within the University and the navy bean and sugarbeet industries.

206. Small Grain Production
Winter. 1(1-0) CSS 101, CSS 202 or CSS 210.
Small grain production, use, and marketing in Michigan and the world.

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.

318. Turfgrass Management
(CSS 418.) Fall. 3(3-0) CSS 210 or concurrently.
Turfgrass management of golf courses, home lawns, parks, and athletic fields. Species identification and adaptation, maintenance and specialized cultural practices, pest identification and control.

331. Soil Management
Winter. 4(4-0) CSS 210.

359. Plant and Animal Genetics
(CSS 230.) Winter. 5(5-0) Juniors or approval of department.
Fundamentals of modern genetics with particular focus on problems and application in agriculture and natural resources.

380. Ecology and Physiology of Agricultural Plants
Spring. 3(3-0) FCR 220 or BOT 301.
Interrelationships of physiological processes of crop growth 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 soil improvement. Interpretation of soil properties for land use decisions.

402. Principles of Weed Control in Field Crops
Fall. 4(3-2) CEM 143, 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, cleaning, packing, and distribution, 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 230. Interdepartmental with the Department of Horticulture.
Application of genetics and other sciences to breeding and improvement of agronomic and horticultural crops.

411. Independent Study
Fall, Winter, Spring, Summer. 1 to 4 credits. May reenroll for a maximum of 8 credits if different problem is taken. Approval of department.
Individual work on a field, laboratory or library research project of special interest to the student and supervised by faculty.

412. Topics in Agronomy
Fall, Winter, Spring, Summer. 2(2-0) or 3(3-0) Majors or approval of school. May reenroll for a maximum of 8 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.

414. Turfgrass Soil Management
Fall. 3(2-0) CSS 318.
Fertility and pH control of turf soils; drainage; irrigation programming, cultivation; topdressing; soil amendments; construction of specialized soils.

416. Principles of Turfgrass Culture
Winter. 3(3-0) CSS 318.
Growth and development of the turfgrass plant as related to turfgrass management practices.

417. Turfgrass Seminar
Fall. 1(2-0) CSS 318.
Seminar by leaders of the turfgrass industry: golf course design and maintenance, specialized equipment, and research developments.

419. Management of Turfgrass Pests
Fall. 4(3-2) CSS 318 or concurrently.
Chemical, biological and cultural methods of managing weed, disease, and insect pests of turfgrass.

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

24. Forest Soils
Spring. 3(3-0) CSS 310. Juniors or approval of department. Forestry majors: FOR 305, FOR 402, FOR 425, FOR 429 concurrently. Interdepartmental with 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.
Crop and Soil Sciences - Descriptions of Courses

823. Plant Breeding Methods
Spring, 3(3-0) IRT 822, STT 423. Interdepartmental with the departments of Forestry and Horticulture.
Methods, strategies and practices in organization and operation of plant breeding programs. Emphasis on practical application of classical, modern and futuristic approaches to plant breeding.

825. Clay Minerals
Winter, 4(3-4) CSS 840, CSS 850 or approval of department. Interdepartmental with and administered by 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.

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 nutrition of plants; fate of nutrients applied to soils, nutrient uptake, translocation and utilization by plants; principles of laboratory, greenhouse and field research methods.

836. Evolution of Crop Plants
Fall of even-numbered years. 3(3-0) CSS 821 or approval of department. Interdepartmental with the departments of Forestry and Horticulture. Administered by the Department of Horticulture.
Cultural and biological aspects of evolution under domestication; origin and diversity of cultivated plants.

838. Tissue Culture for Plant Breeding
(WRT 840.) Winter of even-numbered years. 3(3-0) BOT 414, CSS 851. Interdepartmental with the departments of Forestry and Horticulture. Administered by the Department of Horticulture.
The application of plant cell, protoplast and tissue culture methodologies and principles to crop improvement.

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) MIP 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(0-8) MIP 845 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.
Descriptions — Crop and Soil Sciences of Courses

844. Plant Organelle Genetics
Winter of odd-numbered years. 3(3-0)
Approval of department. Interdepartmental with Genetics and the departments of Botany and Plant Pathology, Forestry, and Horticulture. Administered by the Department of Horticulture.
Organization, structure, function, heredity, molecular biology and manipulation of chloroplasts and mitochondria. Biological interactions between the nucleus and organelles.

850. Soil Chemistry
Winter. 5(3-6) CSE 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.

855. Organic Chemistry of Soils
Spring of odd-numbered years. 3(3-0)
CEM 242.
Relationship of natural and synthetic organic chemicals to chemical and biochemical processes in the soil environment.

870. Origin and Classification of Soils
Winter. 4(3-2) CSE 470, CSE 480, or approval of department.

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

920. Applied Regression Analysis
Spring. 3(3-0) STT 423 or approval of department.
Multiple regression, model selection, the general linear model and confounding in factorial sets of treatments.

940. Theoretical Population Genetics
Winter of even-numbered years. 4(4-0)
MTH 117; STT 422. Intersessional with the departments of Forestry and Horticulture. Administered by the Department of Forestry.
Discussion of mathematical theories in population genetics and experimental works on natural and laboratory populations.

944. Quantitative Genetics in Plant Breeding
Spring of even-numbered years. 4(4-0)
STT 423, CSE 823 or approval of department. Interdepartmental with the departments of Forestry and Horticulture. Administration by the Department of Forestry.

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

EARTH SCIENCE

See Geological Sciences.

ECONOMICS

College of Business and Graduate School of Business Administration

200. Introduction to Macroeconomics
Fall, Winter, Spring. 4(4-0)
Open to Freshmen. Students may begin sequence with either EC 200 or EC 201. Determinants of Gross National Product, unemployment, inflation and economic growth. National income accounting, fiscal policy, aggregate demand and supply management.

201. Introduction to Microeconomics
Fall, Winter, Spring. 4(4-0)
Open to Freshmen. Students may begin sequence with either EC 200 or EC 201. Economic institutions, reasoning and analysis. Consumption, production, determination of price and quantity in different markets. Income distribution, market structure and normative analysis.

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. Economic principles, institutions and reasoning using mathematics, when useful, as a tool of analysis. Consumption, production, the market system, income distribution and elements of employment and inflation theory.

251H. Households, Firms and Markets
Fall. 3(3-0) Honors College students.
Microeconomic theory and its applications to analysis and policy. Substitutes for EC 201, EC 384, and EC 325.

252H. Macroeconomics and Public Policy
Winter. 3(3-0) Honors College students.
Theory of national income, unemployment, inflation and economic growth and its application to economic analysis and policy. Substitutes for EC 200, EC 326 and EC 327 combined.

305. Industrial Relations and Trade Unionism
Fall, Winter, Spring. 3(3-0)
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.

306. Government Programs for Workers
Winter, Spring. 4(4-0) EC 201. Interdepartmental with Public Affairs Management. Economics of selected government institutions and programs for workers. Social security, worker's compensation, Unemployment Insurance, OSHA, employment and training programs, wages and hours legislation, anti-discrimination programs.

318. Money, Credit and Banking
Fall, Winter, Spring. 4(4-0)
EC 200 or EC 210.
Commercial banking and the money supply. The Federal Reserve System, the Treasury, and other financial institutions. Sources and uses of funds in the financial market.

324. Microeconomics I
Fall, Winter, Spring. 3(3-0) EC 200 and EC 201, or EC 210.
Theory of production and cost. Theory of the firm under varying market structures.

325. Microeconomics II
Fall, Winter, Spring. 3(3-0) EC 200 or EC 210, and EC 324.

326. Macroeconomics I
Fall, Winter, Spring. 3(3-0) EC 200 and EC 201 or EC 210.

327. Macroeconomics II
Fall, Winter, Spring. 3(3-0)
EC 326.
Consumption theories, investment theories, role of expectations, cycles of economic growth and cycles, stabilization policies, and other advanced topics.

330. Investments and Security Markets
Fall. 3(3-0) EC 200 or EC 210.
Juniors.
The stock market: principles of investment; analysis of selected industries and corporations; regulation by the Securities and Exchange Commission.

337. American Social and Economic History: Foundations
Winter. 4(4-0) Interdepartmental with and administered by the Department of History. Multiple sources of economic growth in economic, social and political change, education, science and technology, political action, and other factors, mid-18th century.

338. American Social and Economic History: Modern Trends
Spring. 4(4-0) Interdepartmental with and administered by the Department of History. Urbanization, origins and implications of large-scale organizations in business and other sectors of society, and sources of economic growth since mid-18th century.