Descriptions — Criminal Justice of Courses

899. Master’s Thesis Research
Fall, Winter, Spring, Summer. 1 to 12 credits. May reenroll for a maximum of 12 credits. Majors or approval of school. Planned research and writing directed by student’s thesis committee.

930. Seminar on Criminal Justice Systems
Winter. 3(3-0) Graduate students. Topical issues on the development, functioning, and interrelationships of components of criminal justice systems and how systemic coherence can be achieved within a democratic society.

990. Seminar in Criminal Justice and Criminology
Fall. 3 to 5 credits. Graduate students. Analysis of major research contributions to criminal justice and criminology.

992. Research Utilization and Application in Criminal Justice
Spring. 3(3-0) Majors or approval of school. Substantive and administrative problems of conducting research and existing attempts to solve these. Utilization of research in bringing about change in the criminal justice system. Methods of maximizing research utility.

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. 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, environment quality, animal health, food-population dilemma.

204. Corn and Soybean Production
Fall. 2(2-0) 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. 2(2-0) CSS 101, CSS 202 or CSS 210. Small grain production, use, and marketing in Michigan and the world.

210. Fundamentals of Soil Science
Fall, Winter. 4(2-2) CEM 141B. 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.

301. Forage Crops
Fall. 3(3-2) Sophomores. Distribution, morphology, identification, physiology, management and utilization of forage crops for hay,lage, 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, routine and specialized cultural practices, pest identification and control.

350. Plant and Animal Genetics
(CSS 250.) 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) BOT 301; CSS 101 or HRT 101. 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 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, storing, cleaning, packing, and distribution, seed certification of small grains, legumes, corn, beans, potatoes, etc., for 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. 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 problem of special interest to the student and supervised by faculty.

412. Topics in Agronomy
Fall, Winter, Spring, Summer. 3(3-0) or 3(0-3) 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.

414. Turfgrass Soil Management
Fall. 3(2-2) 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. Seminars 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 6 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 211; FOR 305, FOR 408, 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.

426. Microbial Ecology
Spring, 3(3-0) MPH 301 or MPH 303, MPH majors must enroll concurrently in MPH 426A. Interdepartmental with and administered by the Department of Microbiology and Public Health. Microbial activities in natural ecosystems; their associations with plants and animals, and their transformations of carbon, nitrogen and sulfur in soil and aquatic habitats.

426A. Microbial Ecology Recitation
Spring. 1(1-0) MPH 426 concurrently. Interdepartmental with and administered by the Department of Microbiology and Public Health. Quantitative aspects of microbial ecology.
430. Soil Fertility and Fertilizers
Spring. 4(3-2) CSS 210.

440. Soil Biophysics
Winter. 3(3-0) CSS 210 and Bot 301; CSS 390 recommended.

450. World Soils and Land Use
Spring. 3(2-2) CSS 210 or approval of department.
Nature, geography and use of the world's major soils. Uses emphasized will include agriculture, range, and forestry.

460. Independent Study
Fall, Winter, Spring. 1 to 6 credits. May reenroll for a maximum of 3 credits. Individual study on field, laboratory or library research.

470. Soil Classification
Fall, Spring. 4(0-8) CSS 210 or approval of department.
Determination of soil properties by field examination of soil. Classification of soils. Preparation of land use report based upon soil maps of assigned areas. Field trips required.

480. Seed Science
Spring. 3(3-2) Approval of department.
Morphological and physiological changes during seed formation, development, maturation, and germination. Practical and biological aspects related to drying. Storage, deterioration, dormancy and quality. Current problems and research in seed science.

490. Soil Physics
Fall of odd-numbered years. 2(0-0)
Physical properties of soil (texture, structure, consistency, aeration, water, temperature, etc.), their quantitative measurement, and relation to plant growth, agronomic and engineering practices.

495. 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.

500. Soil Classification
 Fall, Winter, Spring, Summer. 2 to 5 credits. May reenroll for a maximum of 12 credits if different topics are taken. Approval of department.
Interdepartmental with the departments of Forestry and Horticulture. Selected topics in plant breeding including: host-plant resistance, nutrition and quality, computerized records and data analysis, classical literature and strategies for improving field, horticulture and forestry crops.

506. Special Problems in Plant Breeding and Genetics
Fall, Winter, Spring, Summer. 1 to 3 credits. May reenroll for a maximum of 3 credits. Students may conduct research in a laboratory, greenhouse or field plot on a selected subject or study selected published literature under the supervision of a faculty member.

510. Seminar
Winter, Spring. 1(1-0)
Topics selected from the physiology of herbicides, microorganisms, advanced soil physics, advanced soil chemistry.

511. Independent Study
Fall, Winter, Spring. 1 to 6 credits. May reenroll for a maximum of 3 credits. Individual study on field, laboratory or library research.

512. Selected Topics
Fall, Winter, Spring. 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, microorganisms, advanced soil physics, advanced soil chemistry.

514. Plant Breeding and Genetics Seminar
Winter. 1(1-0)
World food crops production and related systems of agriculture which provide this resource. The impact of modern discoveries and opportunities for change.

520. Independent Study
Fall, Winter, Spring. 1 to 6 credits. May reenroll for a maximum of 6 credits. Individual study on field, laboratory or library research.

525. 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 by diffraction, differential thermal analysis, infrared absorption and other chemical and physical techniques.

530. 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.

535. Crop and Soil Sciences — Descriptions of Courses

533. 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.

536. Evaluation 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.

538. Tissue Culture for Plant Breeding
(HRT 840) Winter of even-numbered years. 3(3-2) Bot 414. CSS 821. 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.

539. Soil Physics
Fall. 5(3-0) 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, agronomic and engineering practices.

542. Advanced Soil Microbiology
Fall of odd-numbered years. 3(3-0) MPH 420 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.

543. Soil Microbiology Laboratory
Fall of odd-numbered years. 2(0-6) MPH 422 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.

544. 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.

550. Soil Chemistry
Winter. 3(3-0) 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.
865. **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(3-0) CSS 470, CSS 840, or approval of department.

999. **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 113, STT 422, CSS 821. Interdepartmental 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.

941. **Quantitative Genetics in Plant Breeding**
Spring of even-numbered years. 4(4-0) STT 423, CSS 823 or approval of department. Interdepartmental with the departments of Forestry and Horticulture.

944. **Physiological Genetics**
Winter of odd-numbered years. 3(3-0) BOT 415, CSS 821. Interdepartmental with the departments of Forestry and Horticulture. Administered by the Department of Forestry.
Control of variation in higher plants including adaptive physiology, quantitative genetics, growth correlation, biochemical genetics, hybrid physiology, and genealogy.

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

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### ECONOMICS

#### College of Business and Graduate School of Business Administration

Courses are classified as follows:
- **Applied Welfare Economics**-410.
- **Money and Banking**-318, 330, 470.
- **International Economics**-428.
- **Public Finance**-406, 407, 408.
- **Price and Value Theory**-324, 325, 420.
- **Income and Employment Theory**-326, 451, 470.
- **History of Economic Thought**-421, 422.
- **Industrial Organization and Control**-444, 445.

201. **Introduction to Microeconomics**
Fall, Winter, Spring, Summer. 4(4-0)
Open to Freshmen. Students must begin sequence with either EC 201 or EC 202.
Economic institutions, reasoning and analysis, Consumption, production, determination of price and quantity in different markets, income distribution, market structure and normative analysis.

202. **Introduction to Macroeconomics**
(EC 200.) Fall, Winter, Spring, Summer. 4(4-0)
Open to Freshmen. Students may begin sequence with either EC 201 or EC 202.

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, Winter, Spring, Summer. 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. **Microeconomics and Public Policy**
Fall, Winter, Spring, Summer. 5(5-0) 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 328 and EC 337 combined.

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.

306. **Government Programs for Workers**
Winter, Spring, 4(4-0) EC 301. 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, Summer. 4(4-0)
EC 202 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, Summer. 3(3-0) EC 201, EC 202 or EC 210.
Theory of production and cost. Theory of the firm under varying market structures.

325. **Microeconomics II**
Fall, Winter, Spring, Summer. 3(3-0)
EC 201, EC 202 or EC 210, EC 324.

326. **Macroeconomics I**
Fall, Winter, Spring, Summer. 3(3-0)
EC 201, EC 202 or EC 210.

327. **Macroeconomics II**
Fall, Winter, Spring, Summer. 3(3-0)
EC 201.
Consumption theories, investment theories, role of expectations, theories of economic growth and cycles, stabilization policies, and other advanced topics.

330. **Investments and Security Markets**
Fall, Winter, Spring. 3(3-0) EC 202 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-19th 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-19th century.

361. **Economic Development of Asia**
Fall. 3(3-0) EC 301. EC 202 or EC 210.
Population and resources; comparison of three economic systems: Communism in China, free enterprise in Japan and socialism in India; the role of Japan in regional trade and development.

362. **Economic Development of Latin America**
Winter. 3(3-0) EC 201, EC 202 or EC 210.
Concentration of political and economic power as related to income distribution, tax structures, agrarian reform; inflation, trade, exchange rates, integration; population and employment policy.