### CROP AND SOIL SCIENCES

**College of Agriculture and Natural Resources**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Encumbrance</th>
<th>Department</th>
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<tbody>
<tr>
<td>CSS 101</td>
<td>Introduction to Crop Science</td>
<td>4</td>
<td>(3-2) Fall</td>
<td>CSS</td>
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<tr>
<td>CSS 204</td>
<td>Corn and Soybean Production</td>
<td>3</td>
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<td>CSS 205</td>
<td>Navy Bean and Sugarbeet Production</td>
<td>3</td>
<td>(2-0) Winter, Winter</td>
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<td>CSS 206</td>
<td>Small Grain Production</td>
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<td>CSS 210</td>
<td>Fundamentals of Soil Science</td>
<td>3</td>
<td>(3-0) Winter</td>
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<td>CSS 301</td>
<td>Forage Crops</td>
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<td>(2-2) Fall, Bot 310</td>
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<td>CSS 302</td>
<td>Turfgrass Management</td>
<td>3</td>
<td>(3-0) CSS 210 or concurrently</td>
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<td>CSS 305</td>
<td>Plant and Animal Genetics</td>
<td>3</td>
<td>(5-0) Winter, Juniors or approval of department</td>
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<td>CSS 318</td>
<td>Turfgrass Seminar</td>
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<td>Fall</td>
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<td>CSS 319</td>
<td>Management of Turfgrass Pests</td>
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<td>CSS 320</td>
<td>Forest Soils</td>
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<td>CSS 330</td>
<td>Soil Fertility and Fertilizers</td>
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<td>CSS 345</td>
<td>Soil Biophysics</td>
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<td>CSS 360</td>
<td>Pollutants in the Soil Environment</td>
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**Crop and Soil Sciences — Descriptions of Courses**

380. *Ecology and Physiology of Agricultural Plants*

Spring. 3(0-0) BOT 301; CSS 101 or HRT 101. Interrelationships of ecological processes and environmental manipulation for higher yield of agricultural plants.

390. *Soil Conservation and Land Use*

Winter. 3(0-0) 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(2-0) 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(3-0) Winter. 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 350. Interdepartmental with the Department of Horticulture. Application of genetics and other sciences to breeding and improvement of agronomic and horticultural crops.

409. *Terrestrial Hydrology*

Winter. 3(2-2) Winter. Interdepartmental with the Department of Forestry. Global hydrologic cycle, balances, and precipitation. Water storage and flows in vegetation, soil and groundwater of forest, wildland, rural and wetland landscapes. Management effects on evapotranspiration, groundwater recharge, and streamflow.

### 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 or a field, laboratory or library research problem of special interest to the student and supervised by faculty.

### Topics in Agronomy

Fall, Winter, Spring, Summer. 2(0-2) or 3(3-0). May reenroll for a maximum of 2 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.

### Turfgrass Management Seminar

Fall. 3(2-0) CSS 318. Growth and development of the turfgrass plant as related to turfgrass management practices.
Selected Topics in Plant Breeding and Genetics (MTC)
Fall, Winter, Spring, Summer. 2 to 5 credits. May enroll 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.

Special Problems in Plant Breeding and Genetics
Fall, Winter, Spring, Summer. 1 to 3 credits. May enroll for a maximum of 5 credits. Approval of department. Interdepartmental with the departments of Forestry and Horticulture. Administered by the Department of Horticulture.

Plant Breeding Systems
(CSS 822.) Winter, 3(3-0) STT 422 or concurrently. 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.

Plant Breeding Systems
(CSS 822.) Winter, 3(3-0) STT 422. Interdepartmental with the departments of Forestry and Horticulture. Administered by the Department of Horticulture. Breeding systems for improvement of self and cross pollinated and of vegetatively propagated crops. The genetic basis for parent selection.

Genetic Concepts in Plant Breeding
Fall, 3(3-0) CSS 350 or ZOL 441. Interdepartmental with the departments of Forestry and Horticulture. Genetic structure of plant populations, gene action, inbreeding, outbreeding, heterosis, linkage and recombination, genetic architecture of traits, genetic distance.

Clay Mineralogy
(GLG 825.) Winter, 4(3-4) CSS 840, CSS 850 or approval of department. Interdepartmental with the Department of Geological Sciences. 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.

World Food Crops
Spring of odd-numbered years. 3(3-0) CSS 821 or concurrently. Interdepartmental with the departments of Forestry and Horticulture. Administration and operation of world food crops production and related systems of agriculture which provide this resource. The impact of modern discoveries and opportunities for change.

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.

Tissue Culture for Plant Breeding
(HRT 840.) Winter of even-numbered years. 3(2-2) 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.

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.

Advanced Soil Microbiology
Fall of odd-numbered years. 3(3-0) MPI 430 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. Emphasis on current research problems.

Soil Microbiology Laboratory
Fall of odd-numbered years. 2(0-4) MPI 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.

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.

Plant Mineral Nutrition
Winter of odd-numbered years. 4(4-0) BOT 363, CSS 430 or approval of department. Interdepartmental with the Department of Horticulture. Principles of mineral transport in plant cells and tissues. Plant responses to and diagnosis of mineral stresses. Physiological roles of mineral nutrients as related to plant growth and productivity.

Organic Chemistry of Soils
Spring of odd-numbered years. 3(3-0) CEM 241. Relationship of natural and synthetic organic chemicals to chemical and biochemical processes in the soil environment.

Origin and Classification of Soils

Master's Thesis Research
Fall, Winter, Spring, Summer. Variable credit. Approval of department.
Aggregate demand and supply management.

Dentists who have credit in EC 252H may not earn credit in EC 210 if they have credit in either EC 201 or EC 202.

Economics — Descriptions of Courses

210. Fundamentals of Economics
Fall, Winter, 4(4-0) MTH 215 or concurrently. Students may not earn credit in EC 210 if they have credit in either EC 201 or EC 202.

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

251H. Households, Firms and Markets
Fall, 3(3-0) Honors College students. Not open to students who have credit in EC 201, EC 324 and EC 325.

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

252H. Macroeconomics and Public Policy
Winter, 3(3-0) Honors College students. Not open to students who have credit in EC 202, EC 326 and EC 327.


305. Industrial Relations and Trade Unionism
Fall, Winter, Spring, Summer, 4(4-0) EC 201 or EC 202.

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, 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, Summer, 4(4-0) EC 202 or EC 310.

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, 4(4-0) EC 201, EC 202 or EC 210. Not open to students who have credit in EC 251H.


325. Microeconomics II
Fall, Winter, Spring, Summer, 3(3-0) EC 324. Not open to students who have credit in EC 251H.


326. Macroeconomics I
Fall, Winter, Spring, Summer, 3(3-0) EC 201, EC 202 or EC 310. Not open to students who have credit in EC 251H.

Review of national income accounting. Determinants of aggregate income, employment, the price level, and the inflation rate. Policy applications.

327. Macroeconomics II
Fall, Winter, Spring, Summer, 3(3-0) EC 326. Not open to students who have credit in EC 251H.

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, Spring, 3(3-0) EC 202 or EC 210.

The stock market; principles of investment; analysis of selected industries and corporations; regulation by the Securities and Exchange Commission.

361. Economic Development of Asia
Fall, 3(3-0) EC 201, 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.

EARTH SCIENCE

See Geological Sciences.

ECONOMICS

College of Business and Graduate School of Business Administration

201. Introduction to Microeconomics
Fall, Winter, Spring, Summer, 4(4-0) Open to Freshmen. Not open to students who have credit in EC 251H or EC 210.

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 201. Fall, Winter, Spring, Summer, 4(4-0) Open to Freshmen. Not open to students who have credit in EC 252H or EC 210.

Determinants of Gross National Product, unemployment, inflation and economic growth, National income accounting, fiscal policy; aggregate demand and supply management.