Descriptions—Crop and Soil Sciences of Courses

805. Herbicide Action and Metabolism
Spring of even-numbered years, 2(3-0)
Properties and chemistry of herbicides. Processes involved in herbicide action, transport, and fate in plants and soils.
QP: CSS 860

823. Methods in Genetic Engineering of Plants
Fall of even-numbered years, 4(0-8) Interdepartmental with Horticulture and Forestry. Bacterial transformation, Plant transformation via Ti-plasmid, protoplast/PEG, and electroporation involved in herbicide action, transport, and fate in plants and soils.
QP: CSS 850, CSS 840, CSS 470 QA: CSS 825, CSS 870

827. Techniques in Cytogenetics
Fall of odd-numbered years, 1(0-3) Interdepartmental with Horticulture and Forestry. Preparation of chromosomes from commercially important plants for cytogenetic analyses.
QP: CSS 850, CSS 840, CSS 470 QA: CSS 825, CSS 870

831. Soil and Plant Resources for Sustained World Food Production
Spring of even-numbered years, 3(3-0)
World food production capacities related to soil and climatic resources. Management and utilization of genetic resources for sustained production of human foods and animal feeds.
QP: CSS 851, CSS 480

840. Soil Physics
Fall of even-numbered years, 3(3-0)
R: Open only to graduate students in College of Agriculture and Natural Resources, College of Engineering, or College of Natural Science.
Physical properties and interrelationships of soil and climatic resources. Consistency, aeration, moisture content, and temperature. Quantitative measurement of plant growth, Agrometeorological and engineering practices.
QP: CSS 840

850. Soil Chemistry
Spring, 3(0-3)
R: Open only to graduate students in College of Agriculture and Natural Resources, College of Engineering, or College of Natural Science.
Ion activities, equilibria, and soil reactions. Soil pH, macro- and micronutrients, saline soils and availability of nutrients to plants.
QP: CEM 383 QA: CSS 850

853. Plant Mineral Nutrition
Fall of odd-numbered years, 3(3-0) Interdepartmental with Horticulture.
P: BOT 301.
QP: BOT 301 QA: CSS 853

855. Interfacial Environmental Chemistry
Fall of even-numbered years, 4(4-0)
R: Open only to graduate students in College of Agriculture and Natural Resources, College of Engineering, or College of Natural Science.
QP: CSS 812

865. Organic Chemistry of Soils
Spring of even-numbered years, 2(2-0)
Chemistry of natural and anthropogenic organic substances in soils.
QP: CSS 865

880. Independent Study
Fall, Spring, Summer, 1 to 6 credits. A student may earn a maximum of 9 credits in all enrollments for this course.
R: Open only to graduate students in College of Agriculture and Natural Resources, College of Engineering, or College of Natural Science. Individual study on field, laboratory, or library research.
QP: CSS 811

883. Selected Topics
Fall, Spring, Summer, 1 to 3 credits. A student may earn a maximum of 6 credits in all enrollments for this course.
R: Open only to graduate students in College of Agriculture and Natural Resources, College of Engineering, or College of Natural Science. Selected topics in crop and soil sciences of current interest and importance.
QP: CSS 812

899. Master's Thesis Research
Fall, Spring, Summer, 1 to 12 credits. A student may earn a maximum of 96 credits in all enrollments for this course.
R: Open only to master's students in Crop and Soil Sciences.
QP: CSS 899

940. Advanced Soil Physics
Fall of odd-numbered years, 3(2-0)
P: CSS 840. R: Open only to graduate students in College of Agriculture and Natural Resources, College of Engineering, or College of Natural Science.
Modelling major physical transport mechanisms in the soil profile. Aeration, temperature and solute movement. Water movement and evaporation.
QP: CSS 840 QA: CSS 812

941. Quantitative Genetics in Plant Breeding
Spring of odd-numbered years, 3(3-0) Interdepartmental with Forestry and Horticulture.
P: CSS 450. SIT 422.
Theoretical genetic basis of plant breeding with emphasis on traits exhibiting continuous variation. Classical and contemporary approaches to the study and manipulation of quantitative trait loci.
QP: CSS 841

999. Doctoral Dissertation Research
Fall, Spring, Summer, 1 to 24 credits. A student may earn a maximum of 96 credits in all enrollments for this course.
R: Open only to doctoral students in Crop and Soil Sciences.
QP: CSS 999

EARTH SCIENCE

Department of Geological Sciences
College of Natural Science

445. Field Studies in Earth Science
Fall, Spring, Summer, 1 to 4 credits. A student may earn a maximum of 12 credits in all enrollments for this course.
R: Approval of department.
Field experience and techniques in geological sciences. Earth science, soil science, or cosmology.
QP: ES 445

446. Laboratory Investigations in Earth Science
Fall, Spring, Summer, 1 to 4 credits. A student may earn a maximum of 12 credits in all enrollments for this course.
QP: ES 445 or concurrently. R: Approval of department. Laboratory techniques and investigative methods in geological sciences. Earth science, soil science, or cosmology.
QP: ES 445 QA: ES 416

500. Special Problems in Earth Science
Fall, Spring, Summer, 1 to 4 credits. A student may earn a maximum of 12 credits in all enrollments for this course.
R: Approval of department.
Individual faculty-directed study on topics in earth science.
QP: ES 800

ECONOMICS

Department of Economics
The Eli Broad College of Business and The Eli Broad Graduate School of Management

201. Introduction to Microeconomics
Fall, Spring, Summer, 3(3-0)
R: Open only to students with credit in EC 251H.
Economic institutions, reasoning and analysis. Consumption, production, determination of price and quantity in different markets. Income distribution, market structure and normative analysis.
QP: EC 201

202. Introduction to Macroeconomics
Fall, Spring, Summer, 3(3-0)
R: Open only to students with credit in EC 252H.
QP: EC 202

251H. Microeconomics and Public Policy
Fall, Spring, 4(4-0)
R: Open only to Honors College Students.
Economic institutions, reasoning and analysis. Consumption, production, determination of price and quantity in different markets. Income distribution, market structure and normative analysis.
QP: EC 201, EC 202

252H. Macroeconomics and Public Policy
Fall, Spring, 4(4-0)
R: Open only to Honors College Students.
Economic institutions, reasoning and analysis. Consumption, production, determination of price and quantity in different markets. Income distribution, market structure and normative analysis.
QP: EC 201, EC 202

301. Intermediate Microeconomics
Fall, Spring, Summer, 3(3-0)
Theory of consumer choice, production, cost, perfect competition, and monopoly. Welfare economics, general equilibrium, externalities, and public goods.
QP: EC 201, EC 202 QA: EC 324

302. Intermediate Macroeconomics
Fall, Spring, Summer, 3(3-0)
QP: EC 201, EC 202 QA: EC 326

306. Comparative Economic Systems
Fall, Spring, Summer, 3(3-0)
P: EC 201 or EC 251H, EC 202 or EC 252H.
Comparative advantages of economic systems. Alternative patterns of economic control, planning, and market structure. Theory, philosophy, and experiences associated with capitalism, socialism, and mixed economies.
QP: EC 201 or EC 251H, EC 202 or EC 252H QA: EC 434
497. Economics of Education
Spring of even-numbered years. 3(3-0)
P: EC 301 or MTH 126, or concurrently.
QP: EC 201 or EC 251H QA: EC 463

498. Economics of Health Care
Fall of odd-numbered years. 3(3-0)
P: EC 201 or EC 251H
QP: EC 201 or EC 251H QA: EC 410

499. Senior Seminar
Fall, Spring. 3(3-0)
P: EC 251H or EC 301; EC 252H or EC 302; EC 410 or concurrently. R: Open only to seniors in Economics. Capstone course for economics majors. Reading and discussion concerning selected economic topics. Preparation and presentation of student research project.
QP: EC 324 or EC 351H, EC 326 or EC 352H, EC 451

801. Mathematical Applications in Economics
Fall. 3(3-0)
P: MTH 109 or MTH 124 or MTH 132. R: Open only to graduate students in Economics, Agricultural Economics, and Business Administration.
QP: MTH 112 or MTH 122 QA: EC 480, MTH 480

802. Managerial Economics
Fall, Spring. 3(3-0)
P: EC 303. R: Open only to MBA students. Not open to students with credit in EC 305 or EC 312A.
Analysis of the firm. Economics in the use of resources, optimal combination of products, pricing, competitive forces in regional and international markets affecting the firm.
QA: EC 903

804. Macroeconomics
Fall, Spring. 3(3-0)
P: EC 303. R: Open only to MBA students. Not open to students with credit in EC 309 or EC 315A.
QP: EC 303 QA: EC 804

805. Microeconomic Analysis
Fall. 3(3-0)
P: EC 301; EC 301 or MTH 126, or concurrently. R: Open only to graduate students in Economics, Agricultural Economics, and Business Administration. Not open to students with credit in EC 312A.
Microeconomic theory with calculus. Production, costs, demand, markets, general equilibrium and welfare theory.
QP: EC 324, MTH 113 or EC 480 or MTH 480 QA: EC 805A

807. Applied Microeconomic Analysis
Spring. 3(3-0)
P: EC 305
Applications of microeconomic theory taken from public finance, labor economics, international trade, and industrial organization.
QP: EC 305A or EC 812A QA: EC 807

809. Macroeconomic Analysis
Spring. 3(3-0)
P: EC 302; EC 301 or MTH 126, or concurrently. R: Not open to students with credit in EC 312A.
Closed- and open-economy macroeconomic theory with calculus. Inflation, unemployment, growth, business cycles, consumption, investment, and money demand. Policy debates and macroeconomic forecasting.
QP: EC 326, MTH 113 QA: EC 809

811. The Structure of Economic Analysis
Fall. 3(3-0)
P: MTH 133 or EC 301, R: Open only to graduate students in Economics, Agricultural Economics, and Business Administration.
Static and dynamic decision models in economics. Concepts of equilibrium, stability, comparative statics and duality.
QP: MTH 113 or EC 480 or MTH 480

812A. Microeconomics I
Fall. 3(3-0)
P: EC 811 or concurrently.
Consumer behavior, including choice under uncertainty. Theory of production in perfectly competitive markets. General equilibrium in the presence of uncertainty. Efficiency properties of competitive equilibria.
QA: EC 812A

812B. Microeconomics II
Spring. 3(3-0)
P: EC 812A.
Introduction to social choice. Market failure, including externalities, public goods, imperfect information and market power.
QP: EC 812A QA: EC 812B

813A. Macroeconomics I
Fall. 3(3-0)
P: EC 811 or concurrently.
Static and dynamic macroeconomic models. Theories of consumption, investment, money demand and supply. Rational expectations and the government budget constraint.
QA: EC 813A

813B. Macroeconomics II
Spring. 3(3-0)
P: EC 813A.
Now classical theories of business cycles and growth. Theories of price and wage rigidities, search, imperfect competition, and credit rationing in macroeconomic models. Asset pricing.
QP: EC 813A QA: EC 813C

815. Economic Thought I
Fall. 3(3-0)
QA: EC 814A

816. Economic Thought II
Spring. 3(3-0)
German and French economic historicism. Austrian and general equilibrium economics. Neoclassical, institutionalist origins and development of Keynesian economics. History of economic thought in retrospect.
QA: EC 814C

817. The Industrial Revolution
Spring of odd-numbered years. 3(3-0)
Preconditions that led to economic changes in agriculture and industry beginning in the eighteenth century.
QA: EC 855

819. Economic Role of Government
Spring. 3(3-0)
The legal system and local foundations of economic structure and performance. Property rights, the taxing issue, and compensation.
QA: EC 860D

820. Econometrics I
Spring. 3(3-0) Interdepartmental with Agricultural Economics, and Statistics and Probability.
P: EC 801, STT 430.
QP: STT 442, EC 480 or MTH 480 QA: EC 876, EC 885

821. Econometrics II
Fall. 3(3-0) Interdepartmental with Agricultural Economics, and Statistics and Probability.
P: EC 820, STT 442.
QP: EC 876, STT 442 QA: EC 877

822. Econometrics III
Spring. 3(3-0) Interdepartmental with Agricultural Economics, and Statistics and Probability.
P: EC 820, STT 442.
Dynamic models and time series data. ARMA models. ARCH models. Unit roots, cointegration and error correction. Rational expectations models.
QP: STT 442, EC 876 QA: EC 878

823. Applied Econometrics
Fall. 3(3-0)
P: EC 820.
Problems of estimating models and testing hypotheses from economic theory. Applications of various econometric models to economic problems.
QP: EC 855 or EC 876 QA: EC 891

830. Advanced Macroeconomics and Monetary Theory
Fall. 3(3-0)
P: EC 812B; EC 815B.
QP: EC 812G, EC 815C QA: EC 819A

831. Problems in Monetary Theory and Policy
Spring. 3(3-0)
P: EC 809 or EC 813A; EC 820.
Empirical models of money, output, prices and interest rates. Goals and techniques of monetary policy.
QP: EC 809 or EC 813A, EC 855 or EC 876 QA: EC 818C

835. Public Expenditures
Fall. 3(3-0)
P: EC 805 or EC 812A.
Allocative and distributional effects of public expenditure. Public goods and externalities. Selected topics in public expenditure analysis such as cost-benefit analysis, fiscal federalism, mechanism design, public choice, general equilibrium models.
QP: EC 805A or EC 812A QA: EC 806A

836. Public Revenues
Spring. 3(3-0)
P: EC 805 or EC 812A.
QP: EC 805A or EC 812A QA: EC 806B

840. International Trade: Theory and Commercial Policy
Fall. 3(3-0)
P: EC 805 or EC 812A.
QP: EC 805A, EC 809 or EC 812A, EC 812A QA: EC 820C

841. Exchange Rates and Capital Flows
Spring. 3(3-0)
P: EC 805, EC 806; or EC 812A, EC 812A.
QP: EC 805A, EC 809 or EC 812A, EC 812A QA: EC 820C
842. Managerial Economics and Public Policy
Fall, 3(3-0)
R: Open only to MBA students in the Advanced Management Program.
Analysis of the firm. Demand and revenues, optimal production, cost minimization, supply, profitability, and pricing. Competitive forces and public policies in the firm's regional and international markets.

850. Growth, Development, and Human Resources
Fall, 3(3-0)
P: EC 805 or EC 812A.
Theory and measurement of long-run growth, population growth, technological change, capital formation, urbanization, entrepreneurship, and structural change.

851. Domestic and Foreign Development Policies
Spring, 3(3-0)
P: EC 805, EC 812A, EC 815A.
Problems of economic development. Market formation, financial markets and monetary policy, fiscal policy, investment criteria and externalities, trade policy, foreign capital, international disequilibrium.

860. Market Structure and Behavior
Fall, 3(3-0)
P: EC 805A or EC 812A.
The consequences of concentration and entry conditions. Theory of the firm as it relates to size, scope, integration, motivation. Static market behavior. Antitrust treatment of cartels and mergers.

861. Dynamic Market Behavior and Performance
Spring, 3(3-0)
P: EC 805 or EC 812A.

880. Labor Economics I
Fall, 3(3-0)
P: EC 805 or EC 812A.
Labor supply and measurement of the labor force. Labor demand. Mobility, turnover, and migration. Equalizing wage differentials. Trade union growth, goals, bargaining and effects.

881. Labor Economics II
Spring, 3(3-0)
P: EC 805, EC 809; or EC 812A, EC 813A.

895. Graduate Reading in Economics
Fall, Spring, Summer. 1 to 3 credits. A student may earn a maximum of 6 credits in all enrollments for this course. Faculty guided research projects.

911. Strategic Behavior in Economic Environments
Fall, 3(3-0)
P: EC 812B.
Topics include: oligopoly and bargaining theories, strategic voting and principal agent models, endogenous coalitional formation, signaling, strategic trade, and auctions theories.

912. Risk, Uncertainty and Information
Spring, 3(3-0)
P: EC 812A.
Effects of risk in economic environments. Topics include: expected utility theory, risk aversion, stochastic dominance, mean-variance models, state preference models, general equilibrium models with risk, information theory.

999. Doctoral Dissertation Research
Fall, Spring, Summer. 1 to 24 credits. A student may earn a maximum of 90 credits in all enrollments for this course. R: Open only to Ph.D. students in Economics.

EDUCATIONAL ADMINISTRATION

Department of Educational Administration

College of Education

315. Student Leadership Training
Fall, Spring, 3(3-0)
This course provides leadership role, skills, and technique, consistent with the principles and demands of a democratic multicultural society.

380. Organization Theory in Education
Fall, Spring, Summer, 3(3-0)
Organization theories and research applied to educational administration. Topics include comparative organization settings, external environments, organizational effectiveness, and ethics.

390. Management, Planning, and Evaluation
Spring, 3(3-0)
Interaction of leadership with organizational culture and development within a variety of educational organizations.

480. Administration of Human Resources
Fall, Spring, Summer, 3(3-0)
Tasks of personnel management in schools, colleges, and other educational organizations, including recruitment, selection, orientation, development, compensations, and evaluation. Focus on attracting and retaining a quality workforce in education.

513. Education, Development and Social Change
Spring of even-numbered years, 3(3-0)
Interdepartmental with Teacher Education. Rise of modern systems of education in developed and developing countries. Education, the state, and national development. Colonial heritage, linkages, and globalization of educational development.

Economic Analysis—Descriptions of Courses

582A. Elementary and Secondary School Administration
Fall, Summer, 3(3-0)

582B. Secondary School Administration
Fall, Summer, 3(3-0)

583A. Legal, Fiscal, and Policy Environment of Schools
Fall, Summer, 3(3-0)

585B. Research in Educational Administration
Fall, Spring, Summer, 3(3-0)
P: EC 800.
Supervision and evaluation of teaching and learning, and strategies for improvement of K-12 education.

581. Adult Learning
Fall, Summer, 3(3-0)
P: EAD 840.
Adult development and life transitions. Motivation and barriers to participation. Theories of adult learning.

586. Literacy in the Community and Workplace
Spring of even-numbered years, 3(3-0)
P: EAD 840A.
Assessing program goals, setting expectations, developing resources, choosing strategies, and evaluating outcomes.

586A. Literacy in the Community and Workplace
Fall, Spring, Summer, 3(3-0)
P: EAD 840A.
Assessing program goals, setting expectations, developing resources, choosing strategies, and evaluating outcomes.

586B. Literacy in the Community and Workplace
Spring, 3(3-0)
P: EAD 840A.
Assessing program goals, setting expectations, developing resources, choosing strategies, and evaluating outcomes.

586C. Literacy in the Community and Workplace
Fall, Spring, Summer, 3(3-0)
P: EAD 840A.
Assessing program goals, setting expectations, developing resources, choosing strategies, and evaluating outcomes.

586D. Literacy in the Community and Workplace
Fall, Spring, Summer, 3(3-0)
P: EAD 840A.
Assessing program goals, setting expectations, developing resources, choosing strategies, and evaluating outcomes.

586E. Literacy in the Community and Workplace
Fall, Spring, Summer, 3(3-0)
P: EAD 840A.
Assessing program goals, setting expectations, developing resources, choosing strategies, and evaluating outcomes.

586F. Literacy in the Community and Workplace
Fall, Spring, Summer, 3(3-0)
P: EAD 840A.
Assessing program goals, setting expectations, developing resources, choosing strategies, and evaluating outcomes.

586G. Literacy in the Community and Workplace
Fall, Spring, Summer, 3(3-0)
P: EAD 840A.
Assessing program goals, setting expectations, developing resources, choosing strategies, and evaluating outcomes.