815. Supervisory and Executive Development  
Fall, Spring, Summer. 4(4-0) 806 or 808.
Theory and research of developmental stages of executive careers. Special emphasis on: impact of organization on executive potentialities; forces influencing development of executive skills and abilities; studies of antecedents of executive role performance; role of training programs.

821. Production Control  
Winter. 4(4-0) 801.
Planning and control of production operations. Inventory management, production and work force smoothing, job shop scheduling and project scheduling.

830. Fundamentals of Management  
Fall, Winter. 4(4-0) Open only to selected MBA candidates.
The managerial process: planning, organization, measurement, and control of work and work flow; recruitment, placement, motivation, development, and assessment of organizational manpower. Management theory and practice illuminated by managerial and behavioral science research.

831. Computers and Systems Analysis for Business  
Fall, Spring. 4(4-0) 832 or concurrently: MTH 111 and STT 121 or concurrently or 12 credits of college mathematics. Open only to selected MBA candidates.
Computer programming and systems analysis in business administration of tangible and intangible values and in the control of elements of business enterprise.

832. Statistical Methods for Business  
Fall, Spring. 4(4-0) 831 or concurrently: MTH 111 and STT 121 or concurrently or 12 credits of college mathematics. Open only to selected MBA candidates.
Statistics for analysis and research in business.

833. Decision Making Models  
Fall, Winter, Spring, Summer. 4(4-0) 831, 832; AFA 840 or concurrently.
Normative decision analysis in business under different assumptions of information availability.

834. Linear Optimization Models  
Fall, Spring. 4(4-0) 833, MTH 228, STT 423.
Formulation and solution of linear optimization models in business administration under conditions of certainty.

835. Nonlinear Optimization Models  
Winter, Summer. 4(4-0) 834.
Continuation of 834.

836. Stochastic Programming Models  
Spring. 4(4-0) 835.
Formulation and optimization of stochastic programming models in business administration.

860. Corporation Management and Society  
Spring. 4(4-0) 806.
Analysis of the emerging character of administrative structures of the large corporation. Administrative autonomy, corporate government, stockholder and director relationships. Examination of ethics of decision making, strategic values and priorities basic to resource allocation decisions.

880. Organization and Control in the Political Economy: Institutions and Theory  
Winter. 4(4-0) Interdepartmental with and administered by the Economics Department.
Organization and technique in choice and implementation of economic, especially planning and programming, functions of political authority.

881. Organization and Control in the Political Economy: Selected Problems  
Spring. 4(4-0) Approval of instructor. Interdepartmental with the Department of Economics.
Analysis of role and tasks, appropriate techniques and organizational structures of political agencies in planning and management of complex programs.

890. Special Problems  
Fall, Winter, Spring. Summer. Variable credit. Approval of department.

906. Behavioral Research: Organization  
Winter. 3 credits. MTA 508.
Concepts and methods of behavioral science research that are applicable to the study of organization as a strategic device in the development and control of the enterprise.

907. Behavioral Research: Business Executive  
Spring. 3 credits. 906.
Concepts and methods of behavioral science research in the study of the agents of enterprise decision-making and action. Attention is focused on the way in which decisions are made in business organizations and the multiple influences operating on the executive. Modes of adjustment to the decision environment are examined.

908. Seminar in Organization Theory  
Winter. 4(4-0) 508; doctoral candidates; master's candidates with approval of department.
Directed reading and research on issues in contemporary organization theory.

911. Seminar in Personnel Research  
Spring. 4(4-0) 810; doctoral candidates; master's candidates with approval of department.
Directed reading and research on issues in contemporary personnel administration theory and practice.

937. Systems Simulation  
Fall, Summer. 4(4-0) 837, STT 423, MTH 228.
Formulation and application of advanced simulation models to study the behavior and design of complex business and industrial systems.

938. History of Management Science  
Winter. 4(4-0) 506, MTH 314, 425, STT 865.
History of important theoretical developments and applications in the field of management science.

939. Contemporary Issues in Management Science  
(S10.) Spring. 4(4-0) 937, 938.
Detailed treatment of selected recent research applications, and developments in the field of management science.

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

MARKETING AND TRANSPORTATION ADMINISTRATION

College of Business

300. Consumption and Marketing Organization  
Fall, Winter, Spring, Summer. 4(2-2)
EC 200
Adjustment of the firm to its market environment with emphasis on competitive strategy. Assessment of market forces and opportunities with reference to social, political, economic and technological forces affecting distribution methods and institutions. Structural organization of marketing systems and functions involved in effective market performance. Small group problems involving analysis of costs and efficiency.

301. Management of Marketing Effort  
Fall, Winter, Spring. 4(3-3) 300.
Market management in relation to total enterprise. Problems, analytical tools and approaches to decisions concerning allocation of funds to various aspects of market cultivation. Development of promotional strategy, price policy and management of field selling effort. Particular attention to role of marketing research, forecasting, budgets, organization arrangements and control techniques. Use of cases in small groups.

311. Principles of Selling  
Fall, Winter, Spring, Summer. 3(2-1)
Nature of personal selling and its requirements. Functional relationships of selling in marketing mix. Buyer motivations and selling theories, with application to various buyer-seller situations.

312. Sales Management  
Fall, Winter, Spring, Summer. 4(4-0)
300
Techniques and policies in the administration of the personal sales organization with respect to the marketing strategies involved. Emphasis on the sales management problems of manufacturers.

316. Fundamentals of Statistical Inference  
Fall, Winter, Spring, Summer. 4(4-0) STT 121. Primarily for students in the College of Business. Interdepartmental with and administered by the Statistics and Probability Department.
Description of sample data, applications of probability theory, sampling, estimation, tests of hypothesis.

317. Quantitative Business Research Methods  
Fall, Winter, Spring, Summer. 4(3-3) STT 316.
Interdepartmental with the Statistics and Probability Department.
Application of statistical techniques to business decision-making. Topics covered include applications of linear regression and correlation, analysis of variance, selected non-parametric tests, time series, and index numbers.

335. Food Processing and Distribution Management  
(435.) Winter. 3(2-0) 300 or FSM 200. Interdepartmental with Food Systems Economics and Management.
Analysis of problems faced in the food processing and distribution system. Includes functional interrelationships, consumer orientation and future development.
341. Transport Requirements and Programming
Fall, Spring, Summer. 4(4-0) EC 860
Transportation and distribution systems are presented as functional entities capable of introducing change into the economic system and capable of resulting in change in other segments of the economy. Subject matter includes regional economic growth, inter-regional trade, market location theory, transportation and distribution system alternatives, regional transportation policy.

351. Retail Administration
Fall, Winter, Spring, Summer. 4(4-0)
Survey of retailing and its role in distribution. Transportation and distribution systems are presented as functional entities capable of introducing change into the economic system and capable of resulting in change in other segments of the economy. Subject matter includes regional economic growth, inter-regional trade, market location theory, transportation and distribution system alternatives, regional transportation policy.

445. Physical Distribution Analysis
Fall, Winter, Summer. 4(4-0) 300
Analysis of the logistics of distribution systems for firms engaged in marketing and manufacturing. Component parts of each system are studied and analytical tools are presented for selecting those alternatives which will attain the distribution goals of the firm.

448. Passenger Transportation Systems
(447.) Spring, 4(4-0) Interdepartmental Studies with School of Hotel, Restaurant and Institutional Management.
Composition and objectives of principal passenger travel markets. Analysis of carrier service, pricing and promotional practices and problems, competitive and cooperative relations. Review of major proposals for change and expansion of service systems.

452. Retail Policies and Problems
Fall, Spring, Summer. 5(5-0)
Analysis of retail problems with intensive examination of selected current major problem areas. Critical review of controls and techniques used to achieve management objectives. Cases, readings and field work.

478. Canadian-American Studies
For course description, see Interdisciplinary Courses.

502. Administrative Research Methods
Fall, Spring. 4(4-0)
Research process, methods and techniques as a basis for business planning and problem solving. Covered are scientific methodology and problem solving, selected models and model building, selected statistical decision techniques and computer applications.

804. Marketing Concepts and Processes
Fall, Winter. 4(4-0) AFA 839; EC 890; concurrently.
The business is considered relative to its external environment. Includes: comprehension of marketing system, the principal environmental opportunities and constraints facing the marketing manager, major marketing informational, control and coordination devices available to the firm will be studied.

805. Marketing: Models, Theories and Strategies
Fall, Winter, Spring, Summer. 4(4-0) 804; AFA 940; MGT 533.
Analysis of marketing functions: programming marketing effort, and control and coordination are considered within the context of industrial and consumer demand, strategic and decision-making aspects of marketing are stressed.

807. Foundations of Industry
Fall, Summer. 3(3-0)
Functional appraisal of materials foundation of business enterprise, emphasizing allocation, support capacity and essential characteristics of present and future industrial resources as they affect business decisions, opportunities and responsibilities.

808. Emerging Issues in the Business Environment
Winter, Summer. 4(4-0) Thirty credits of MBA core program, or approval of department.
Selected significant current organizational, social, political, economic and cultural issues are examined in relation to business policy and decision making. Discussions, readings and research reports. Topics selected may vary from term to term.

810. Macro Distribution Systems
Fall, Winter. 4(4-0)
Provides a functional knowledge of transportation and distribution systems. Areas covered include: the geography of marketing, the comparative basis for trade, transportation costs and trade restrictions, functional analysis of carriers, sources of flow data, introduction to distribution systems, and the emerging programs of national policy.

811. Seminar in Marketing
Fall, Winter, Spring, Summer. Variable credit. May re-enroll for a maximum of 15 credits.

812. Analysis of Logistical and Distribution Systems
Winter. 4(4-0)
Specific tools are developed for the individual firm in analyzing space arrangements of markets, plant and warehouse location, inventory systems, selection of carrier alternatives and selection of physical movement channels.

823. Seminar in Retailing
Winter. 4(4-0)
Critical analysis of available generalizations concerning the economic, social, and commercial role of retailing. Special attention to concepts of retail competition and productivity. Emphasis on research in improving retail efficiency.

831. Advanced Food Processing and Distribution Management
Fall, Spring. 4(4-0) May re-enroll for a maximum of 6 credits. Approval of Director of Food Marketing Management Program. Primarily for Food Marketing Management majors.
Food industry adjustment to changing social, economic and international company environment. Managerial principles and techniques applied to food processing and distribution. Student interaction with industry, labor and government representatives.

841. Management of Transportation and Distribution Systems
Spring. 4(4-0)
Integrative course drawing heavily on the content of 810 and 812, bringing these to a decisive focus on the logistics of macrodistribution and microdistribution systems. Cases are used to illustrate the principles and develop a relevant context.

851. Market Behavior and Competitive Strategy
Fall, Winter, Summer. 5(5-0) AFA 805.
Industrial and consumer market structure and behavior and their impact upon the firm's competitive operations and actions.

853. Market Programming
Winter, Spring, Summer. 4(4-0) or concurrently, 805; AFA 840.
Planning processes leading to programming of the major elements of market cultivation. Major emphasis is given to the development of a total marketing strategy for the firm. Case analysis.

854. Problem-Solving Processes in Marketing
Fall, Spring. 4(4-0) AFA 853.
The problem-solving process is approached through the investigation and solution of current marketing problems by research teams.
585. Market Cost-Revenue Analysis
Winter. 4(4-0) One course in accounting and one in marketing. Interdepartmental with the Accounting and Financial Administration Department.
Analytical tools for use in planning and controlling marketing activities. Emphasis on the factors. Application of tools to determination of cost-revenue patterns and market potentials.
580. International Business
Winter, Summer. 4(4-0) 804 and EC 860.
The economic environment within which the international firm operates is presented. Special emphasis on relating trade and payments theory, regional analysis, and economic development to strategy formulation of the firm. Marketing, financial, and organizational factors are considered.
562. International Marketing
(859.) Spring. 4(4-0) 805, 860 or approval of department.
Models for headquarters planning and control of international marketing operations are developed. Social, cultural, institutional, and economic variables are considered in studying marketing operations in foreign environments.
583. Problems in International Business
881. Fall. 4(4-0) 860 or approval of department.
Examination of strategies and organization for international business. In-depth consideration of headquarters and overseas personnel, marketing, financial, and legal issues.
990. Special Problems
Winter, Spring, Summer. Vari­able credit. Approval of department.
590. Analysis of Business Enterprise Systems
Fall. 3 credits. 805; MGT 809.
Research concepts and scientific methods for the study of business enterprise systems. The design of research, formulation of hypotheses, concepts of measurements and use of quantitative methods in the study of business systems.
509. Theory of Transportation—Distribution Systems
Fall. 4(4-0)
Examines the functions of transportation-distribution systems. Develops the relevant elements of networks, systems, and economic theory with empirical design. Applications to the design evaluation, and control of representative macro and micro systems.
910A. Advanced Research in Marketing I
(910.) Winter. 4(4-0) Second-year doctoral students in marketing.
Advanced concepts and quantitative methods in the scientific investigation of market phenomena and the tools of market cultivation.
910B. Advanced Research in Marketing II
(910.) Spring. 5(5-0) 910A.
Continuation of MTA 910A.
911A. History of Marketing Thought
(911.) Fall. 4(4-0) May re-enroll for a maximum of 15 credits. 851.
Traces the evolution of marketing institutions, techniques, theories and criticisms. The influence of changing environmental and technological factors on marketing practice and thought. Readings in recent and original materials, discussion and research paper.
911B. Seminar in Macro Marketing
(911.) Winter. 4(4-0) May re-enroll for a maximum of 15 credits. 911A.
Examines the relationships between competition, marketing and corporate and economic growth. Emphasis is given to a functional analysis of competition and the central role of innovation in the process.
912. Research Methodology in Transportation-Distribution Systems
Winter. 4(4-0) 812, 990.
Research methodology in the design and administration of transportation-distribution systems. Emphasis on technique and methodology for conducting systems design studies and evaluation of common implementational problems.
921. Advanced Sampling and Estimation Techniques in Business Administration
Spring. 5(5-0)
Research design, estimation and decision criteria including Bayesian estimators, small sampling, stratified sampling, random and non-random sampling, information theory, powers of tests.
941. Transportation-Distribution Development Policy
Spring. 4(4-0) 920, 912.
Applications in theory, principles, and processes developed in MTA 916 and MTA 915 to the design of research processors and server in significant transport and distribution problems.
957. Seminar in Micro Marketing
Spring. 4(4-0) 911A.
Examines the current state of theory concerning the planning and implementation of marketing strategies and programs, and tries to identify where future research is needed and/or will be most useful to marketing and business managers.
999. Research
Fall, Winter, Spring, Summer. Variable credit. Approval of department.
MATHMATICS MTH
College of Natural Science
One and one-half years of high school algebra and one year of geometry and a satisfactory score on the placement test are prerequisites for all courses in the Mathematics Department which carry credit.
801. Elements of Algebra
Fall, Winter, Spring. 0(3-0) 23(3-0)† Current enrollment in 103.
Fractions, decimals, real number properties, algorithms of arithmetic, simple factoring, parentals, reciprocals, linear equations, integer exponents, applied problems, coordinate systems, graphing, solving equations by graphing.
802. Intermediate Algebra
Fall, Winter, Spring. 0(3-0) 23(3-0)† Current enrollment in 104, one year of high school algebra.
Properties of real numbers, polynomials, factoring, rational functions, exponents, roots and radicals, first and second degree equations, linear inequalities, complex numbers, word problems.
102. Trigonometry
Fall, Winter, Spring. 3(3-0) 1½ high school units in algebra and satisfactory score on placement test, or 052; 1 high school unit in geometry. Not open to students who have had trigonometry in high school or credit in 109.
Trigonometric functions, identities, related angles, radian measure, graphs, sum and difference formulas, simple trigonometric equations, logarithms, solution of plane triangles, inverse functions.
103. Elements of Algebra
Fall, Winter, Spring. 2(2-0) Current enrollment in 051.
Fractions, decimals, real number properties, algorithms of arithmetic, simple factoring, parentals, reciprocals, linear equations, integer exponents, applied problems, coordinate systems, graphing, solving equations by graphing.
104. Intermediate Algebra
Fall, Winter, Spring. 3(3-0) Current enrollment in 052, one year of high school algebra.
Properties of real numbers, polynomials, factoring, rational functions, exponents, roots and radicals, first and second degree equations, linear inequalities, complex numbers, word problems.
108. College Algebra and Trigonometry I
Fall, Winter. 5(5-0) ½ high school units in algebra and satisfactory score on placement test, or 052; 1 high school unit in geometry. Not open to students with credit in 111.
Number systems; variables; functions and relations; mathematical induction; exponents and radicals; elementary theory of equations; binomial theorem; determinants, matrices and systems of equations.
109. College Algebra and Trigonometry II
Fall, Winter. 5(5-0) ½ high school units in algebra and superior score on placement test, or 105; 1 high school unit in geometry. Not open to students with credit in 101 or 111.
Continuation of 108 plus trigonometry including definition of circular functions, angular measure, fundamental identities.
111. College Algebra
Fall, Winter, Spring. 5(5-0) ½ years of high school algebra, 1 year of high school geometry, satisfactory score in algebra placement examination, trigonometry or 102 or concurrently. Not open to students with credit in 108 or 052.
Sets and equations, simultaneous equations and matrices, vectors, inequalities, functions and relations, inverse functions, elementary theory of equations, trigonometric equations and identities, polar coordinates, parametric equations, straight line analytic geometry.
112. Calculus I with Analytic Geometry
Fall, Winter, Spring. 5(5-0) 109 or 111.
The sequent 112, 113, 214, 215 is an integrated course in calculus, analytic geometry and differential equations covering derivatives, curve sketching, definite and indefinite integrals, area, volume, transcendental functions, vector analysis, solid geometry, partial differentiation, multiple integrals, infinite series, power series, differential equations.