831. Computers and Systems Analysis for Business
Fall, Spring. 4(4-0) 832 or concurrently; MTH 111 and STT 315 or concurrently or 12 credits of college mathematics. Open only to selected MBA candidates.
Computer programming and systems analysis in business administration.

832. Statistical Methods for Business
Fall, Spring. 4(4-0) 831 or concurrently; MTH 111 and STT 315 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.
Linear programming: basic concepts and terminology; Model building with LP applications to problems from business. The simplex method: Introduction to duality problems. Economic interpretations of duality. Post-optimality analysis.

835. Nonlinear Optimization Models
Winter, Summer. 4(4-0) Students may not receive credit for both SYS 835 and MGT 833, CHE 485 or MGT 834 or knowledge of linear programming. Interdepartmental and jointly administered with Systems Science and the Department of Chemical Engineering.

836. Applied Stochastic Processes for Business
Spring. 4(4-0) 835.
The structure and analysis of stochastic models common to business and economics. Topics may include the Poisson process, renewal-reward processes, Markov processes, with examples from queueing, reliability, maintenance, and inventory.

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

889. Organization and Control in the Political Economy: Institutions and Theorv
Winter of even-numbered years. 4(4-0) Interdepartmental with and administered by the Department of Economics.
Organization and technique in choice and implementation of economic, especially political, functions of political authority.

881. Organization and Control in the Political Economy: Selected Problems
Winter of odd-numbered years. 4(4-0) Approval of instructor, interdepartmental with and administered by 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 903.
Concepts and methods of behavioral science research that are applicable to the study of organization as a strategic device in the development of tangible and intangible values and in the control of elements of business enterprise.

907. Behavioral Research: Business Executive
Fall, 3(4-0)
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) 805; doctoral candidates may receive credit 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 may receive credit with approval of department.
Directed reading and research on issues in contemporary personnel administration and practice.

937. Systems Simulation
Fall. 4(4-0) 838, STT 423, MTH 228. Interdepartmental with the Department of Statistics and Probability.
The concept of a model, model building, characteristics of simulation models. Techniques of computer simulation. Simulation models in research and management planning/control. Validation and experimental design. Special purpose languages.

948. Mathematical Programming for Business
Spring. 4(4-0) 836, MTH 314, 426, STT 867. Interdepartmental with the Department of Statistics and Probability.

949. Advanced Applied Stochastic Processes
Winter. 4(4-0) 830, 937. Interdepartmental with the Department of Statistics and Probability.
Selected topics from the following areas: Semi-Markov, Markov-renewal and regenerative processes; Markov and semi-Markov decision processes; decision theory, applications from production, inventory, reliability, queuing, and gaming theory.

999. Research
Fall, Winter, Spring, Summer. Variable credit. Approval of department.
335. Food Processing and Distribution Management  
Winter. 3(3-0) 300 or FST 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. Transportation Plans and Policies  
Fall, Spring, Summer. 4(4-0) Juniors. Policy formulation in logistics, transportation and distribution (LTD) systems. Examination of historical forces and trends, major contemporary demand and supply influences, development of a functional framework, survey of major emerging policies.

351. Retail Management  
Fall, Winter, Spring, Summer. 4(4-0) 300, AFA 201 or concurrently. Management methods, locational analysis, store organization, personnel planning, merchandising, buying and pricing techniques and customer service policies for retail firms. Survey of retailing and its role in distribution.

400H. Honors Work  
Fall, Winter, Spring. 1 to 15 credits. Approval of department. Investigates models, concepts and research findings of particular significance to effective decision making in administration of marketing and transportation systems.

409. Field Studies in Business  
Fall, Winter, Spring. Summer. Variable credit. May re-enroll for a maximum of 8 credits. Approval of department. Planned program of independent research or observation, study, and work in selected business firms. Designed to supplement classroom study in such a way as to make maximum contribution to student's total educational experience.

414. Marketing Research  
Fall, Winter, Spring, Summer. 5(5-0) 300, 316. Research process as an aid to decision-making in marketing management. Specific attention to the planning of research and gathering analysis and interpretation of data.

415. International Market Systems  
Fall, Winter. 4(4-0) Juniors. Development of criteria for evaluating foreign markets. Design of international organization and marketing systems. Study of major methods, modes and strategies of international trade and operation. Communications through reports and case decisions.

418. Marketing Development and Policies  
Fall, Winter, Spring. 4(4-0) 301, 414 and at least 3 additional credits of MTA electives. Study and integration of major tasks and decisions involved in developing and marketing products. Comprehensive discussion of cases involving different decisions for a variety of products.

439. Advanced Food Processing and Distribution Management  
Fall. 3(3-0) 335. Interdepartmental with Food Systems Economics and Management. Managerial principles and techniques applied to food processing and distribution. Emphasizes adjustment to changing social, economic and internal company environment. Student interaction with industry, labor and government representatives, field trips, special projects.

445. Management of Logistics Transportation and Distribution Systems  
Fall, Winter, Spring. 4(4-0) Juniors. Micro analysis of private and public enterprise transportation and distribution systems. Component parts of the movement system, analytical tools used in system planning, implementation and control.

448. Passenger Transportation Systems  
Winter. 4(4-0) 500 or HRI 375. Interdepartmental with the School of Hotel, Restaurant and Institutional Management. Composition and objectives of principal passenger transportation systems. Analysis of carrier services, pricing and promotional practices and problems, competition and cooperative relations. Review of medium proposals for change and expansion of service systems.

452. Retail Policies and Problems  
Spring. 4(4-0) 351. Analysis of retail problems with selection of current major problem areas. Critical review of budgetary and other controls, standards and techniques used to achieve management objectives.

802. Research Analysis for Marketing Decisions  
Fall, Spring. 4(4-0) Use of research techniques as an aid in marketing decision making. Research process involving research problem definition, hypothesis formulation, data collection, interpretation and presentation. Case projects may be used.

804. Marketing Concepts and Processes  
Fall, Winter. 4(4-0) The business is considered relative to its external environment. Institutions comprising the marketing system, the principal environmental opportunities and constraints facing the marketing manager, and the major marketing informational, control and coordination devices available to the firm will be studied.

809. Planning Logistics, Transportation, and Distribution Systems  
Fall, Winter. 4(4-0) Planning and control of the enterprise logistics system and physical distribution operations. System approach will emphasize plans appropriate to objectives of the enterprise—private, public, or carrier.

810. National Transportation Policy and Plans  
Fall, Winter. 4(4-0) An operational model and theoretical perspective of national policies that are apt to shape the future of the transportation system. Interaction of government, carrier, and user logistics and distribution strategies.

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

812. Problems in Logistics, Transportation, and Distribution Systems  
Winter, Spring. 4(4-0) 810. Design, application, and measurement of the cost and service performance of a specific enterprise's logistics system. Includes examination of applicable research concepts, planning models and control techniques.

831. Advanced Food Processing and Distribution Systems  
Fall, Winter, Summer. 4(4-0) 809. 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.

832. Seminar in Retailing  
Winter. 4(4-0) Seminar in selected organizational, social, political, economic and cultural issues related to management in marketing channels.

833. Advanced Food Processing and Distribution Management  
Fall, Spring. 4(4-0) May re-enroll for a maximum of 8 credits. Approval of department. Interdepartmental with the Department of Agricultural Economics. Food industry adjustment to changing social, economic and internal company environment. Managerial principles and techniques applied to food processing and distribution. Student interaction with industry, labor and government representatives.

841. Management of Logistics, Transportation, and Distribution Systems  
Spring, Summer. 4(4-0) 810. A case course in management problems encountered in logistics, transportation, and distribution systems. Merits considered for alternative solutions and implementation strategies in the decision making process.

851. Market Behavior and Competitive Strategies  
Fall, Winter, Summer. 4(4-0) 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) 602
or concurrently, 805; AFA 840.
Planning processes leading to programming the various 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) 853.
The problem-solving process is approached through the investigation and solution of current marketing problems by research teams.

855. Market Cost-Revenue Analysis
Winter. 4(4-0) 855.
One course in accounting and one in marketing, Interdepartmental with the Department of Accounting and Financial Administration.
Analytical tools for use in planning and controlling marketing activities. Emphasis on the determination of factors causing marketing cost differences and the assignment of costs to those factors. Application of tools to determination of expenditure-revenue patterns and market potentials.

860. International Business
Winter. 4(4-0) 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.

862. International Marketing
Spring. 4(4-0) 862.
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.

883. Problems in International Business
Fall. 4(4-0) 883 or 862 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.

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

905. Analysis of Business Enterprise Systems
Fall. 3 credits. 805; MGT 806.
Research concepts and scientific methods for the study of business enterprise systems. The design of research, formulation of hypotheses, collection of data, and the application of quantitative methods in the study of business systems.

909. Theory of Transportation-Distribution Systems
Fall. 4(4-0) 909.
Examines the functions of transportation-distribution systems. Develops the relevant elements of network analysis, 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
Winter. 4(4-0) 910A.
Second-year doctoral students in the program. Advanced concepts and quantitative methods in the scientific investigation of market phenomena and the tools of market cultivation.

910B. Advanced Research in Marketing II
Spring. 5(5-0) 910A.
Continuation of 910A.

911A. History of Market Thought
Fall. 4(4-0) 911A.
Revises the evolution of marketing institutions, techniques, theories and criticisms. The influence of changing environmental and technological factors on marketing practice and thought. Readings in retrospective and original material, discussion and research paper.

911B. Seminar in Macro Marketing
Winter. 4(4-0) 911B.
Examines the relationships between competition, marketing and corporate and economic growth. Emphasis is given to a functional examination of competition and the central role of innovation in the process.

912. Research Methodology in Transportation-Distribution Systems
Winter. 4(4-0) 912. 909.
Research methodology in the design and administration of transportation-distribution systems. Emphasis on techniques and methodology for conducting system design studies and evaluation of common implementational problems.

941. Transportation-Distribution Development Policy
Spring. 4(4-0) 941.
Applications in theory, principles, and processes developed in MTA 909 and MTA 912 to the design of research processes and reports in significant transport and distribution problems.

103. Elements of Algebra
Fall, Winter, Spring. 3(3-0) 103.
Properties of real numbers, polynomials, factors, rational functions, exponents, roots and radicals, first and second degree equations, linear inequalities, complex numbers, word problems. Approved through Spring term 1978.

104. Intermediate Algebra
Fall, Winter, Spring. 3(3-0) 104.
Properties of real numbers, polynomials, factors, rational functions, exponents, roots and radicals, first and second degree equations, linear inequalities, complex numbers, word problems. Approved through Spring term 1978.

105. College Algebra and Trigonometry I
Fall, Winter. 5(5-0) 105.
High school units in algebra and satisfactory score on placement test, or 082; 1 high school unit in geometry. Not open to students with credit in 111.

106. College Algebra and Trigonometry II
Fall, Winter. 5(5-0) 106.
High school units in algebra and satisfactory score on placement test, or 082; 1 high school unit in geometry. Not open to students with credit in 111.

107. Elements of Algebra
Fall, Winter, Spring. 3(3-0) 107.
Properties of real numbers, polynomials, factors, rational functions, exponents, roots and radicals, first and second degree equations, linear inequalities, complex numbers, word problems. Approved through Spring term 1978.

108. Intermediate Algebra
Fall, Winter, Spring. 3(3-0) 108.
Properties of real numbers, polynomials, factors, rational functions, exponents, roots and radicals, first and second degree equations, linear inequalities, complex numbers, word problems. Approved through Spring term 1978.

109. College Algebra and Trigonometry I
Fall, Winter. 5(5-0) 109.
High school units in algebra and satisfactory score on placement test, or 082; 1 high school unit in geometry. Not open to students with credit in 111.

110. Finite Mathematics with Applications
Fall, Winter, Spring. 5(5-0) 110.
Elementary combinatorial analysis, binomial theorem, vectors and matrices, convex sets and linear programming, graph theory, applications to theory of games.

ARTIFICIAL INTELLIGENCE

Additional course offerings in the field of artificial intelligence continue to be provided, including advanced courses in the mathematical foundations of the field.