936. Applied Stochastic Processes for Business
Spring, 4(4-0) 936.
The structure and analysis of stochastic models common to business and economics. Topics may include the Poisson process, renewal-reward processes, discrete Markov processes, with examples from queueing, reliability, maintenance and inventory.

942. Mathematical Programming For Business
Spring, 4(4-0) 930, 934, 936, STT 563. Interdepartmental with the Statistics and Probability Department.

949. Advanced Applied Stochastic Processes
Winter, 4(4-0) 936, 937. Interdepartmental with the Statistics and Probability Department.
Selected topics from the following areas: Semi-Markov, Markov-renewal and regenerative process models; 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.

MARKETING AND TRANSPORTATION ADMINISTRATION MTA

College of Business

300. Consumption and Marketing Organization
EC 200. Fall, Winter, Spring, Summer. 4(3-3)
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 system-functions involved in effective market performance. Small group problems involving analysis of costs and efficiency.

301. Management of Marketing Effort
Fall, Winter, Spring. 4(2-3) 300.
Market management in relation to total enterprise. Problems, analytical tools and approaches to decisions concerning allocation of funds to various means 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.

313. Sales Management
Fall, Winter, Spring, Summer. 4(4-0)
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(3-0)
SST 316. 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 hypotheses.

335. Food Processing and Distribution Management
(355) Winter. 3(3-0) 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, Summer. 4(4-0) EC 200.
Transportation and distribution systems are presented as functional entities capable of introducing change into the economic system and capable of reacting to changes in other segments of the economy. Subject matter includes regional economic growth, inter-regional trade, macro-location theory, transportation and distribution system alternatives, regional transportation policy.

351. Retail Administration
Fall, Winter, Summer. 4(4-0) 300.
Survey of retailing and its role in distribution. Management policy areas studied include administrative organization, locational decisions, buying, pricing, merchandising, sales promotion, personnel, and over-all planning and coordination in retailing firms. Analysis of illustrative cases.

400H. Honors Work
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 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, models, and strategies of international trade and operations. Applications 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 MBA 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.

420. Consumer and Buyer Behavior  
Fall, Spring, Summer. 4(4-0) 300, 317 or concurrently.
Consumer and buyer behavior characteristics, theories, and research methods for marketing strategy and problem solving.

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. 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.) Winter. 4(4-0) Interdepartmental with the 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 comprehensive proposals for change and expansion of service systems.

452. Retail Policies and Problems  
Winter. 4(4-0) 351.
Analysis of retail problems with intensive examination of selected current major problems areas. Critical review of controls and techniques used to achieve management objectives. Cases, readings and field work.

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

802. 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 539; EC 600 concurrently.
The business is considered relative to its external environment. Institutions comprising the marketing system, the environmental opportunities and constraints facing the marketing manager, and the major marketing information, control and coordination devices available to the firm will be studied.

805. Marketing: Models, Theories and Strategies  
Fall, Winter, Spring, Summer. 4(4-0)  
Analysis of marketing functions, programming marketing effort, and control and coordination are considered within the context of industrial and consumer demand. Strategic 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. Discussion, 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 physical basis 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 spatial 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 is given to concept of retail competition and productivity. Emphasis on research in improving retail efficiency.
Descriptions — Marketing and Transportation Administration

863. Problems in International Business
(861.) Fall. 4(4-0) 860 or approv.
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, concepts of measurement and use of quantitative methods in the study of business systems.

909. Theory of Transportation—Distribution Systems
Fall. 4(4-0)
Examines the functions of transportation-distribution systems. Develops the relevant elements of network 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 Market Thought
(911.) Fall. 4(4-0) May re-enroll for a maximum of 15 credits. 891.
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 retrospective and original material, 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 examination of competition and the central role of innovation in the process.

912. Research Methodology in Transportation-Distribution Systems
Winter. 4(4-0) 812, 906.
Research methodology in the design and administration of transportation-distribution systems. Emphasis on technique and methodology for conducting system design studies and evaluation of common implementation problems.

941. Transportation-Distribution Development Policy
Spring. 4(4-0) 960, 912.
Applications in theory, principles, and processes developed in MTA 900 and MTA 912 to the design of research processes and reports 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, control, and competition of marketing. Emphasis on 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.

MATHEMATICS

MTH

College of Natural Science

One and one-half years of high school algebra and a year of geometry and a satisfactory score on the placement test are prerequisites for all courses in the Mathematics Department which carry credit.

905. Elements of Algebra
Fall, Winter, Spring. 0(3-0) 103
Current enrollment in 103.

909. Trigonometry
Fall, Winter, Spring. 3(3-0) 909

102. Intermediate Algebra
Fall, Winter, Spring. 0(2-0) 3(3-0)† Current enrollment in 102, 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.

103. Elements of Algebra
Fall, Winter, Spring. 2(2-0) Current enrollment in 081.
Fractions, decimals, real number properties, algorithms of arithmetic, simple factoring, polynomials, 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 082, 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.
†See page A-2 item 9.

108. College Algebra and Trigonometry I
Fall, Winter, Spring. 5(5-0) 1½ 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.
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) 1½ high school units in algebra and superior score on placement test, or 082; 1 high school unit in geometry. Not open to students with credit in 108 or 111.
Continuation of 108 plus trigonometry including definition of circular functions, angular measure, fundamental identities.

110. Finite Mathematics with Applications
Winter, Spring. 5(5-0) 108 or 111.
Elementary combinatorial analysis, binomial theorem, vectors and matrices, convex sets and linear programming, graph theory, applications to theory of games.

111. College Algebra
Fall, Winter, Spring, Summer. 5(5-0) 1½ 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 109.
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 112.
The sequence 112, 113, 214, 215 is an integrated course in calculus, analytic geometry and differential equations covering derivatives, curve sketching, definite and indefinite integrals, areas, volume, transcendental functions, vector analysis, solid geometry, partial differentiation, multiple integrals, infinite series, power series, differential equations.

113. Calculus II with Analytic Geometry
Fall, Winter, Spring. 5(5-0)
A continuation of 112.

122. Calculus II
Winter. 5(5-0) 109 or 112; not open to engineers, physical science or mathematics majors or to students with credit in 112.
The first of a two-term course in primarily single variable calculus with an introduction to several variables for students who want only one or two terms of calculus.

123. Calculus III
Spring. 5(5-0) 122, not open to engineers, physical science or mathematics majors or to students with credit in 113.
The second of a two-term course in primarily single variable calculus with an introduction to several variables for students who want only one or two terms of calculus.