

- 295. Independent Study**
Fall, Winter, Spring. 2 to 4 credits.
May re-enroll for a maximum of 12 credits.
Approval of college.
Student conceived individual courses of study in curricular areas. Preliminary faculty approval and continuing guidance.
A. Independent Study—General
B. Independent Study—Biology
C. Independent Study—Chemistry/Physics
D. Independent Study—Mathematics
E. Independent Study—Science Studies

- 331. Modern Fiction**
Fall. 4(4-0) 132 or 131 with a 3.0 or better.
Recent fiction and its cultural backgrounds, particularly those of special value to students of science. Students may submit original fiction in partial fulfillment of course writing requirements.

- 332. Modern Drama**
Winter. 4(4-0) 132 or 131 with 3.0 or better.
Recent plays which have social and literary significance. Students may submit original dramatic writings as partial fulfillment of course writing requirements.

- 333. Modern Poetry**
Spring. 4(4-0) 132 or 131 with 3.0 or better.
Recent poetry of literary and social nature. Students may submit original poetry in partial fulfillment of course writing requirements.

- 344. Introductory Animal Systematics Laboratory**
Fall. 1(0-3) ZOL 303 concurrently.
Interdepartmental with the Department of Zoology.
Laboratory examination of form and function of representative vertebrate and invertebrate animals.

- 361. Philosophy of Technology**
Fall, Winter. 4(4-0) Sophomores or approval of college. Interdepartmental with the Department of Philosophy.
Is our technology desirable? Are its social forms desirable? What alternatives are there? Students will develop and defend their own appraisals of technology.

- 372. Introduction to Symbolic Logic**
Fall, Winter. 4(4-0) Sophomores or approval of college.
Concepts, notation and application of truth-functional and quantificational logic. Special topics may include axiomatics, meta-theory, modal logic, fallacies, paradoxes, inductive argument, the justification of logic.

- 373. Introduction to the Philosophy of Science**
Winter, Spring. 4(4-0) 372. Juniors or approval of college.
Philosophical problems about the character and justification of scientific knowledge. Possible topics: concept formation, theory construction, scientific explanation, confirmation theory, "logic" of discovery, philosophical implications of physical theories.

- 374. Historical Problems in the Biological Sciences**
Fall, Winter. 4(4-0) Juniors or approval of college.
Various themes or periods in the biological sciences. The course may emphasize the pattern of theoretical development, changes in explanatory ideals, the interaction of external factors and scientific ideas, etc.

- 375. Historical Problems in the Physical Sciences**
Spring. 4(4-0) Juniors or approval of college.
Various themes or periods in the physical sciences. The course may emphasize the pattern of theoretical development, changes in explanatory ideals, the interaction of external factors and scientific ideas, etc.

- 376. Historical Problems in Technical Change**
Fall, Spring. 4(4-0) Juniors or approval of college.
Factors which influence technical change. Exploration of both historical and contemporary problems of technology and technical change.

- 377. The Natural Environment: Perceptions and Practices**
Spring. 4(4-0) Sophomores.
Factors which have influenced U.S. environmental attitudes as reflected in art and literature. Ways in which changing attitudes have led to changes in legislation and practice.

- 378. Popular Culture and Technical Change**
Winter. 4(4-0) Juniors or approval of college.
How mass culture and technology affect each other. The course demonstrates several approaches to this question and introduces students to research in this area.

- 483. Philosophy of Physical Science**
Fall. 4(4-0) Nine credits in physical science or approval of department. Interdepartmental with the Department of Philosophy.
Philosophical problems of the physical sciences. The topics will be taken from such areas as: quantum mechanics, space-time, classical mechanics, relativity.

- 484. Philosophy of Biological Sciences**
Winter, Spring. 4(4-0) Nine credits in science or approval of department. Interdepartmental with the Department of Philosophy.
Methodological notions and problems of the biological sciences such as: observation and measurement, classification, teleological and functional explanation, teleological systems, emergentism, vitalism, value neutrality.

- 490. Directed Study**
Fall, Winter, Spring. 2 to 6 credits.
May re-enroll for a maximum of 6 credits.
Juniors and approval of college.
Faculty directed studies in curricular areas which are normally related to regular course offerings.

- A. Directed Study—General
- B. Directed Study—Biology
- C. Directed Study—Chemistry/Physics
- D. Directed Study—Mathematics
- E. Directed Study—Science Studies

- 491. Senior Seminar I**
Fall, Winter, Spring. 3(3-0) Seniors or approval of college.
Selected interdisciplinary problems concerned with the interface between science and society or science and man are identified and formulated. A bibliography is generated and an outline for a thesis prepared.

- 492. Senior Seminar II**
Fall, Winter, Spring. 3(3-0) 491.
The thesis planned in 491 is written and evaluated.

- 493. Field Experience**
Fall, Winter, Spring. 4 to 15 credits.
May re-enroll for a maximum of 16 credits.
Approval of college.
Experiential learning related to the public or private practice of science and technology.

- 495. Independent Study**
Fall, Winter, Spring. 2 to 12 credits.
May re-enroll for a maximum of 12 credits.
Juniors and approval of college.
Student conceived individual courses of study in curricular areas. Preliminary faculty approval and continuing guidance.
A. Independent Study—General
B. Independent Study—Biology
C. Independent Study—Chemistry/Physics
D. Independent Study—Mathematics
E. Independent Study—Science Studies

MANAGEMENT MGT

College of Business

- 101. Introduction to Business**
Fall, Winter, Spring. 4(4-0) University College students or approval of department.
Functions performed by business and the role of administration in our economy as a whole and in the operation of a specific business. Four major objectives: to aid students in choosing a vocation, to help Business majors select a field of concentration, to show the place of specialized techniques presented in more advanced business courses, and to give some familiarity with common business practices and terminology.

- 300. Operations Planning**
Fall, Spring. 4(4-0) CPS 110, STT 315, AFA 202.
Operations Management—functions and technologies. Planning and acquiring physical facilities, work design and work measurement, acquisition and management of materials.

- 301. Operations Control**
Winter. 4(4-0) 300.
Analysis and control of operations. Production control, product reliability, maintenance, cost control and management information systems.

- 302. Organization and Administration**
Fall, Winter, Spring, Summer. 4(4-0) Junior Business majors; EC 201 and AFA 201.
Analysis of the internal organization structure and of executive roles and functions in the business enterprise and other goal-directed institutions. Examines administrative and managerial concepts in the context of behavioral research in business. Cases and outside research reports are used for specific analyses.

- 305. Materials and Purchasing Management**
Fall, Winter. 4(4-0) 302 or MTA 300 or Juniors; non-majors.
Planning, organizing and controlling materials; acquisition in industrial enterprises, institutions, and government. Management of purchasing, materials movement, storage and control. Value analysis, purchasing research, vendor relations and purchase forecasting.

**Descriptions — Management
of
Courses**

306. Analysis of Processes and Systems
Fall, Winter, Spring. 4(4-0) CPS
110, STT 316.

Analysis of some fundamental systems and process concepts which are basic to industrial management. The course is oriented toward computer model building, acquainting the student with the use of the computer as an instrument for analysis of complex problems in industry. Course includes consideration of criteria for efficiency and optimization, and program planning.

310. Fundamentals of Personnel Administration

Fall, Winter, Spring, Summer. 4(4-0)
Juniors.

Organization, functions, and policy administration of employee relations activities in the business enterprise; consideration of new techniques of employment, training, wage payment, morale-building, and employee security.

403. Purchasing and Materials Research

Winter. 4(4-0) Juniors.

Applied research focusing on the purchasing and materials management functions in organizations. Administration and operation of the research effort. Field research studies.

405. Operations Management: Current Topics

Spring. 4(4-0) 301, 302.

Consideration of current and controversial questions in the operations area. Field experience to study operations and policies in industrial, institutional, and service organizations.

406. Introduction to Management Science

Winter. 4(4-0) 306.

Quantitative models and techniques applied to various business problems integrating the computer into the problem solving process. Topics include linear programming, integer programming, dynamic programming, queuing problems, Bayesian Decision Theory, theory of games.

409. Business Policy

Fall, Winter, Spring, Summer. 4(4-0)
Seniors in business administration and 302;
AFA 391; MTA 300.

Problems, methods, and analytical frameworks for building and maintaining consistent and effective policy frameworks in the business enterprise. Written and oral analyses are made of comprehensive cases cutting across the major functions within business organizations. Team and individual reports are required.

411. Personnel Selection and Development

Winter. 4(4-0) 310; MTA 317.

Manpower input problems of business organizations — manpower planning, recruitment, selection, placement, training and development at all levels. Focus is on policy issues, research findings, and advanced techniques.

412. Compensation and Motivation

Spring. 4(4-0) 310.

Manpower motivation and compensation problems in business organizations — performance appraisal, job evaluation, wage and salary administration, non-financial incentives and the impact of job content and job context factors on performance.

413. Occupational Safety and Health Administration

Fall, Winter. 4(4-0) Juniors; 302 for
majors.

Programs and procedures for control of work accidents and maintenance of health in business and other organizations. Analysis of costs related to employee and product safety. Administration of a safety program in compliance with new Federal law.

414. Human Relations in Business

Fall, Winter, Summer. 4(4-0) 310,
Seniors; approval of department. Students may
not receive credit in both MGT 414 and PSY
350.

Human problems in business administration: examination of the empirical research dealing with organizational and administrative problems in business, including morale, motivation, authority, power, centralization, commitment, and mobility.

415. Managerial Approaches to Collective Bargaining

Winter, Spring. 4(4-0) 302 or Jun-
ior non-business majors.

Union-management problems and managerial strategy and tactics in collective bargaining — the union challenge, legal constraints, negotiations and operating under the contract, dimensions of cooperation and conflict.

417. Minorities and Women in the World of Work

Fall, Spring. 4(4-0) Senior majors or
approval of department. Interdepartmental with
the Department of Racial and Ethnic Studies
and the School of Social Work.

Racial, ethnic, sexual and other minority experiences and problems in the world of work. Awareness training approach (what it's like to be . . .) featuring movies, guests, subgroup discussions and encounter-type exercises.

468. Field Studies

Fall, Winter, Spring, Summer. Vari-
able credit. May re-enroll for a maximum of
8 credits. Business administration majors and
approval of department.

Planned program of observation, study, and work in selected business firms. Designed to supplement classroom study in such a way as to make maximum contribution to students' total educational experience. Field work may be arranged in finance, insurance, marketing, personnel management, production management, purchasing, real estate, retailing, transportation and banking.

801. Work Design and Administration

Fall. 4(4-0)

Design, improvement, and problems in the administration of work systems with emphasis on repetitive operations. Criteria for evaluating systems. Tools for developing, analyzing, and improving procedures. Cases and projects.

802. Materials Management

Spring. 4(4-0)

Advanced study of the policies, practices and problems relating to the procurement and control of materials in business organizations.

IDC. Seminar in Industrial Relations

For course description, see Interdis-
ciplinary Courses.

806. Organization and Administration

Fall, Winter, Spring, Summer. 4(4-0)
Approval of department.

Dynamics of organization: the organization seen as an open system interacting with a rapidly changing environment, as a structure of organized human cooperation, as an instrument of managerial strategy; current theory and research applied to organizational process and design.

807. Administrative Policy

Fall, Winter, Spring, Summer. 4(4-0)
833; MTA 804; AFA 889; plus 30 credits in
the MBA core program.

Application of administrative theory and techniques to business situations through cases cutting across major functions within business organization. Cases viewed from standpoint of general management with consideration of social and physical environmental forces surrounding the firm.

808. Seminar in Management, Organization, and Administration

Fall, Winter, Spring, Summer. 4(4-0)
May re-enroll for a maximum of 12 credits.

Philosophy, practice, research, and current problems in management, organization, and administration. Historical and current literature, lectures, discussion, individual research, cases and plant visits are methods of study used in various terms.

HISTORY OF MANAGEMENT THOUGHT Fall.

Development of management concepts as evidenced in the writings of major contributors. Environment factors and relation of early ideas to current thought.

CONTEMPORARY ISSUES IN ADMINISTRATION

Spring.

Recent and current developments in the administration of business enterprises. Examination of theory and practice.

ORGANIZATION THEORY Winter, Summer.

Critical and comparative consideration of organization theory with special reference to industrial organizations. Problems of organization structure and administrative practice in the management of business concerns are analyzed in the light of objectives, environment, and current theories.

810. Personnel Management

Fall, Winter, Summer. 4(4-0) 806.

Principles and methods of recruiting, selecting, training, evaluating, motivating, and rewarding personnel. Fringe benefits, retirement, absenteeism, and other employee benefit problems.

811. Advanced Problems in Personnel Management

Fall, Spring, Summer. 4(4-0) May re-
enroll for a maximum of 8 credits. 810.

Advanced studies in selected administrative and technical policies and practices in employee relations, with individual and group project work and research.

813. Human Relations in Management

Fall, Spring. 4(4-0) Approval of
department.

The executive role: Theories and techniques of leadership, communications, conflict management, morale, motivation, authority, power, examined by means of cases, role playing, laboratory exercises, and study of behavioral science research findings.

814. Occupational Safety and Health Management

Spring. 4(4-0) Graduate students or
approval of department.

Objectives and procedures for managerial control of work injuries and illness in business and other organizations. Complying with federal and state law, correcting hazards, analyzing costs, modifying behavior. Product safety.

818. 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 potentiality; 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.

**MARKETING AND
TRANSPORTATION
ADMINISTRATION** **MTA**

College of Business

- 292. Selected Topics**
Fall, Winter, Spring. 3(3-0) or 4(4-0)
May re-enroll for a maximum of 8 credits when a different topic is taken.
Selected subject matter of current interest in marketing: social, institutional, and managerial, etc., topics. Subject varies by terms.
- 300. Marketing Management in Business and Society I**
Fall, Winter, Spring, Summer. 4(4-0)
EC 200.
Firm and consumer roles in the exchange system for goods and services. Competitive analysis of market structures and marketing management. Fitting product-service offerings to various customer group needs.
- 301. Marketing Management in Business and Society II**
Fall, Winter, Spring, Summer. 4(4-0)
300.
Development of distribution, communication and pricing policies. Integration of product, distribution, communication and price policies into a marketing plan. Emphasis on financial aspects of marketing and impact on society.
- 311. Personal Selling**
Fall, Winter, Spring, Summer. 3(3-0)
Theories, principles, methods and techniques of personal selling with application to different buyer-seller situations. Development of interpersonal communication skill. Career opportunities in selling.
- 313. Sales Management**
Fall, Winter, Spring, Summer. 4(4-0)
300.
Organization and administration of the firm's personal selling. Topics include: recruitment, selection, training, compensation, evaluation, development, and motivation of salesmen; market assessment, territory alignment, and quotas; segmental analysis and budgeting.
- 316. Fundamentals of Statistical Inference**
Fall, Winter, Spring, Summer. 4(5-0)
STT 315. Primarily for students in the College of Business. Interdepartmental with and administered by the Department of Statistics and Probability.
Description of sample data, applications of probability theory, sampling, estimation, tests of hypotheses.
- 317. Quantitative Business Research Methods**
Fall, Winter, Spring, Summer. 4(3-2)
316. Interdepartmental with the Department of Statistics and Probability.
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.
- 320. Consumer and Buyer Behavior**
(420.) Fall, Winter, Spring, Summer. 4(4-0)
300.
Consumer buyer behavioral characteristics, theories and research methods for marketing and strategies and problem solving. Emphasis on predicting and understanding purchase behavior for best firm/buyer needs match.

- 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 with applications to problems from business. The simplex method. Introduction to dual 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 835. CHE 465 or MGT 834 or knowledge of linear programming. Interdepartmental and jointly administered with Systems Science and the Department of Chemical Engineering.
Nonlinear optimization-examples and applications. Kuhn-Tucker Theory. Saddle point optimality conditions. Algorithms for problems with constraints. Unconstrained optimization; introduction to search methods.
- 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, discrete Markov processes, with examples from queuing, reliability, maintenance and inventory.
- 860. Corporation Management and Society**
Spring. 4(4-0) 806.
Analysis of the emerging character of administrative structure of the large corporation. Administrative autocracy, 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 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 planning and programming, 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 905.
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) 806; 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. 4(4-0) 836, 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 334, 426, STT 863. Interdepartmental with the Department of Statistics and Probability.
Large mathematical programs with special structure. Duality and decomposition in mathematical programming. Basic theory of dynamic programming; multistage decision processes and the principle of optimality. Risk, uncertainty, and introduction to stochastic and adaptive control processes.
- 949. Advanced Applied Stochastic Processes**
Winter. 4(4-0) 836, 937. Interdepartmental with the Department of Statistics and Probability.
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.