

- 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
356.

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 Junior 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. Variable 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 Interdisciplinary 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 cus-
tomer 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 interper-
sonal 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; seg-
mental 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 ad-
ministered 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 ap-
plications 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, theo-
ries 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 concu-
rently; 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 concu-
rently; MTH 111 and STT 315 or concu-
rently 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 ter-
minology. Model building with LP with appli-
cations to problems from business. The simplex
method. Introduction to dual problems. Eco-
nomic 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 appli-
cations. Kuhn-Tucker Theory. Saddle point opti-
mality conditions. Algorithms for problems with
constraints. Unconstrained optimization; intro-
duction 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 ex-
amples from queuing, reliability, maintenance
and inventory.

**860. Corporation Management and
Society**
Spring. 4(4-0) 806.
Analysis of the emerging character of adminis-
trative structure of the large corporation. Adminis-
trative autocracy, corporate government, stock-
holder 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 im-
plementation of economic, especially planning
and programming, functions of political au-
thority.

**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 Eco-
nomics.
Analysis of role and tasks, appropriate tech-
niques and organizational structures of political
agencies in planning and management of com-
plex programs.

890. Special Problems
Fall, Winter, Spring, Summer. Vari-
able credit. Approval of department.

**906. Behavioral Research:
Organization**
Winter. 3 credits. MTA 905.
Concepts and methods of behavioral science re-
search that are applicable to the study of organ-
ization 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 re-
search in the study of the agents of enterprise
decision-making and action. Attention is focused
on the way in which decisions are made in busi-
ness organizations and the multiple influences
operating on the executive. Modes of adjust-
ment to the decision environment are examined.

908. Seminar in Organization Theory
Winter. 4(4-0) 806; doctoral candi-
dates; master's candidates with approval of
department.
Directed reading and research on issues in con-
temporary organization theory.

911. Seminar in Personnel Research
Spring. 4(4-0) 810; doctoral candi-
dates; master's candidates with approval of de-
partment.
Directed reading and research on issues in con-
temporary 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 Depart-
ment of Statistics and Probability.
Large mathematical programs with special struc-
ture. Duality and decomposition in mathe-
matical programming. Basic theory of dynamic
programming; multistage decision processes and
the principle of optimality. Risk, uncertainty,
and introduction to stochastic and adaptive con-
trol processes.

**949. Advanced Applied Stochastic
Processes**
Winter. 4(4-0) 836, 937. Interde-
partmental with the Department of Statistics
and Probability.
Selected topics from the following areas: Semi-
Markov, Markov-renewal and regenerative pro-
cess models; Markov and semi-Markov decision
processes; decision theory, applications from
production, inventory, reliability, queuing, and
gaming theory.

999. Research
Fall, Winter, Spring, Summer. Vari-
able credit. Approval of department.