

**490. Senior Research**  
Spring. 3(3-0)  
Individual projects demonstrating ability to do independent research.

**808. Foundations of Modern Linguistics**  
Fall. 3(3-0) LIN 403.

Critical reading of basic texts of modern linguistics from 1900 to the 1950's with primary emphasis on American writers.

**821. Phonological Analysis**  
Fall, Winter, Spring. 3(3-0) May reenroll for a maximum of 9 credits. Approval of department.

Advanced study of phonology, generally utilizing one of the following theories: stratificational, tagmemic, transformational.

**831. Grammatical Analysis**  
Fall, Winter, Spring. 3(3-0) May reenroll for a maximum of 9 credits. Approval of department.

Advanced study of syntax and related topics, generally utilizing one of the following theories: stratificational, tagmemic, transformational.

**835. Semantics of Natural Languages**  
Spring. 3(3-0) LIN 431 or approval of department.

Selected topics on the study of meaning in human languages. History, issues, and theories of semantics.

**IDC. Interdisciplinary Seminar on Africa**  
For course description, see *Interdisciplinary Courses*.

**851. African Linguistics**  
Winter. 3(3-0) May reenroll for a maximum of 9 credits. LIN 401; LIN 402 or concurrently.

Investigation of linguistic issues and phenomena in one or a group of African languages.

**860. Special Projects**  
Fall, Winter, Spring, Summer. Variable credit. Approval of instructor.

Supervised study, reading, and research in specialized areas of linguistics.

**865. Contrastive Analysis**  
Spring. 3(3-0) LIN 403.

The essentials of contrastive analysis, with emphasis on methods of making such analysis. The usefulness of and controversies concerning contrastive analysis will also be discussed.

**871. Comparative Indo-European Linguistics**  
Spring of odd-numbered years. 3(3-0) LIN 471.

Comparative linguistics as applied to the investigation of the development and historical relationships of the languages of the Indo-European family.

**880. Seminar in Linguistics**  
Fall, Winter, Spring. 3(3-0) May reenroll for a maximum of 18 credits in different topics. Approval of department.

Advanced critical study of current topics in linguistics such as applications to other disciplines, aspects of linguistic theory, child language acquisition, contrastive analysis, structure of particular languages.

**899. Master's Thesis Research**  
Fall, Winter, Spring, Summer. Variable credit. Approval of instructor.

**999. Doctoral Dissertation Research**  
Fall, Winter, Spring. Variable credit. Approval of instructor.

**LYMAN BRIGGS COLLEGE LBC**

**111. College Algebra**  
Fall. 5(5-0) Placement Test or approval of college. Not open to students with credit in MTH 108, MTH 109, or MTH 111.

Rational and real numbers, functions, inverse functions, polynomials, rational functions, exponential and logarithmic functions, trigonometric functions and their inverses.

**112. Calculus I**  
Fall, Winter, Spring. 5(5-0) LBC 111 or MTH 109; LBC 124 concurrently. Not open to students with credit in MTH 112.

Theory and applications of derivatives to polynomials, rational functions, trigonometric functions and their inverses, logarithmic and exponential functions. Definition and properties of the definite integral. Numerical approximations of definite integrals.

**113. Calculus II**  
Fall, Winter, Spring. 5(5-0) LBC 112 and LBC 124. Not open to students with credit in MTH 113.

Further applications of the derivative to related rates, approximations including Newton's method and graphing. The mean value theorem. Integration techniques, applications, and improper integrals. The conics and polar coordinates.

**124. APL-Computer Programming for Scientists**  
Fall, Winter, Spring. 3(3-0) LBC 112 or concurrently. Interdepartmental with the Department of Computer Science.

APL programming; interactive programming techniques; arithmetic, logical, and extended APL operators; functions; applications to current topics in mathematics; principles of operations of time-shared computers.

**131. Third Culture Rhetoric I**  
Fall, Winter. 4(4-0)

Instruction and practice in expository writing. Paper and report topics drawn from readings which relate science and human values.

**132. Third Culture Rhetoric II**  
Winter, Spring. 4(4-0) LBC 131.

Continuation of LBC 131 with emphasis upon investigative papers. Selected students may meet course requirements through independent study.

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For prerequisite purposes the introductory biology sequence LBC 140, 141, 242 may be used in place of Biological Science 210, 211, 212.

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**140. Biology I**  
Winter, Spring. 4(3-3) Not open to students with credit in B S 212.

The organisms and their environment. Organismal level of organization. Evolution and adaptation as forces for biological variance.

**141. Biology II**  
Fall, Spring. 4(3-3) LBC 140; not open to students with credit in B S 210.

Cellular structure and function. Maintenance and manipulation of materials, energy, space and information at the cellular and tissue level of organization.

**142. Biology IA**  
Winter, Spring. 1 to 2 credits. My reenroll for a maximum of 4 credits. LBC 140 or concurrently.

Selected problems such as analysis of biological data, interspecific and intraspecific competition, microarthropods inhabiting leaf litter, spring flora, diversity, stability and evolution of natural communities.

**143. Biology IIA**  
Fall, Spring. 2 credits. May reenroll for a maximum of 4 credits if different topic is taken. LBC 141 or concurrently.

Selected biology problems considering such topics as genetics, bacterial culturing and staining techniques, photosynthesis and histological techniques.

**160. Physics-Elementary Concepts**  
(150.) Winter. 1(2-0) LBC 162 or concurrently.

Elementary concepts of mechanics, electricity, magnetism and optics.

**161. Introduction to Chemistry and Physics I**  
Fall. 3(4-0) MTH 108 or MTH 109 or MTH 111 or LBC 111 concurrently; LBC 161L or concurrently or approval of instructor.

Gases and gas laws, kinetic theory, heat and thermodynamics. Equilibria, solutions, acids and bases, ionization and electrolysis.

**161L. Introductory Chemistry Laboratory**  
Fall. 1(0-3) LBC 161 or concurrently or approval of instructor.

Techniques and instruments in the chemistry laboratory. Includes qualitative, quantitative and synthetic work.

**162. Introduction to Chemistry and Physics II**  
Winter. 3(4-0) LBC 161; LBC 162L or concurrently or approval of instructor.

Basic concepts of atomic and nuclear structure, wave particle duality, the quantum theory and the special theory of relativity. Radioactivity, nuclear reactions and elementary particle physics.

**162L. Introductory Physics Laboratory**  
Winter. 1(0-3) LBC 162 or concurrently or approval of instructor.

Introduction to techniques and instruments in the physics laboratory. Selected experiments in classical and modern physics.

**Descriptions – Lyman Briggs College  
of  
Courses**

**163. Introduction to Chemistry and Physics III**  
Spring. 3(4-0) LBC 162; LBC 163L or concurrently or approval of instructor.

Periodic properties and chemical families, stoichiometry, modern theory of chemical bonding, molecular orbitals. Chemical dynamics and equilibria, some organic chemistry nomenclature and reaction kinetics.

**163L. Introductory Chemistry Laboratory**  
Spring. 1(0-3) LBC 163 or concurrently or approval of instructor.  
Continuation of LBC 161.

**216. Calculus III**  
Fall, Winter, Spring. 5(5-0) LBC 113.  
Series, sequences, power series including Taylor series, and indeterminate forms. Graphing and vector geometry in 3-spaces. Differential calculus of functions of several variables through Taylor series and extreme points.

**217. Calculus IV**  
(214.) Fall, Winter, Spring. 5(5-0) LBC 216 Credit may not be earned in both LBC 217 and MTH 310.  
Double and triple integrals and their applications. Line integrals. Ordinary differential equations of first order and linear second order equations, including series solutions. Numerical methods for single and Simultaneous equations.

**233. Special Topics in Third Culture Rhetoric**  
Fall, Winter, Spring. 1 to 2 credits.  
May reenroll for a maximum of 6 credits. LBC 132.  
Guided study of relations between the humanities and sciences. Students submit written work.

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For prerequisite purposes the introductory biology sequence LBC 140, 142, 242 may be used in place of Biological Science 210, 211, 212.

**242. Biology III**  
Fall, Winter. 4(3-3) LBC 141. Not open to students with credit in BS 211.  
Organismal growth and development from molecular genetics through life cycles of selected plant and animal species.

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**IDC. Energy Consumption and Environmental Quality**  
For course description, see Interdisciplinary Courses.

**261. Introduction to Chemistry and Physics IV**  
Fall. 3(4-0) LBC 163; LBC 261L or concurrently or approval of instructor; LBC 112 or MTH 112 recommended.  
Kinematics and dynamics of classical particle and rigid body motion. Fundamentals of atomic, molecular vibration-rotation and nuclear magnetic resonance spectroscopy.

**261L. Introductory Physics Laboratory**  
Fall. 1(0-3) LBC 261 or concurrently or approval of instructor.  
Continuation of LBC 162L.

**262. Introduction to Chemistry and Physics V**  
Winter. 3(4-0) LBC 261; LBC 262L or concurrently or approval of instructor.  
Chemistry of non-metals, transitional elements and coordination compounds, some organic chemistry. The major emphasis is on descriptive chemistry using principles developed in LBC 161, LBC 162, and LBC 163.

**262L. Introductory Chemistry Laboratory**  
Winter. 1(0-3) LBC 262 or concurrently or approval of instructor.  
Continuation of LBC 163L.

**263. Introduction to Chemistry and Physics VI**  
Spring. 3(4-0) LBC 261; LBC 263L or concurrently or approval of instructor.  
Classical theory of electricity and magnetism. Electromagnetic wave motion and wave optics. Selected topics in solid state physics, and the special and general theories of relativity.

**263L. Introductory Physics Laboratory**  
Spring. 1(0-3) LBC 263 or concurrently or approval of instructor.  
Continuation of LBC 261L.

**290. Directed Study**  
Fall, Winter, Spring. 1 to 6 credits.  
May reenroll for a maximum of 6 credits. Approval of college.  
Faculty directed studies in curricular areas which are normally related to regular course offerings.

**A. Directed Study--General**

1 or 2 credits.

**B. Directed Study--Biology**

1 or 2 credits.

**C. Directed Study--Chemistry/Physics**

1 or 2 credits.

**F. Directed Study--Computer Science**

1 to 3 credits.

**295. Independent Study**  
Fall, Winter, Spring. 1 to 4 credits.  
May reenroll 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) LBC 132 or LBC 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) LBC 132 or LBC 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) LBC 132 or LBC 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 animal.

**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) 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. Interdepartmental with American Studies.

Interrelationships among elements of mass culture and technical change. Introduction to relevant research methods.

**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. 1 to 6 credits. May reenroll 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) LBC 491.

The thesis planned in LBC 491 is written and evaluated.

**493. Field Experience**  
Fall, Winter, Spring. 4 to 15 credits. May reenroll 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. 1 to 12 credits. May reenroll 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) MGT 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) MGT 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.

**306. Analysis of Processes and Systems**  
Fall, Winter, Spring. 4(4-0) CPS 110, MTA 317 or concurrently.

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) MGT 301, MGT 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) MGT 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 MGT 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) MGT 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) MGT 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; MGT 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) MGT 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.