College of Natural Science

Lyman Briggs School has a six term sequence in Chemistry and Physics that may be completed to fulfill the School's requirements in Chemistry and Physics. This sequence involves Lyman Briggs School 181 through 263L and the Lyman Briggs School 261 through 263L. It is a coordinated sequence that is comparable to certain courses in the Department of Chemistry and the Department of Physics. Any student who plans to complete only part of the sequence must contact the faculty coordinator of either the Chemistry or the Physics portion.

801. Slavic Bibliography and Research Methods
Fall of odd-numbered years. 3(3-0)
Bibliographies of Slavic literature and languages. The library and the utilization of its resources. Principles of bibliographic compilation and research techniques in Russian literature and linguistics.

817. Nineteenth Century Russian Prose I
Fall of odd-numbered years. 3(3-0)
Pushkin and Chekhov's search for a modern literary expression. Grammatical structure of the first written Slavic language accompanied by readings from the canonical Old Church Slavic texts.

825. Introduction to Old Church Slavic
Fall of even-numbered years. 3(3-0)
Basic knowledge of Russian or another Slavic language.

832. Russian Drama Before 1859
Winter of odd-numbered years. 3(3-0)
Origin and development of Russian drama. Analysis of major plays by Fontana, Griboyedov, Pushkin, Lermontov and Gogol.

836. Nineteenth Century Russian Poetry
Winter of even-numbered years. 3(3-0)
Trends and styles in 19th century Russian poetry up to 1890. Emphasis on major poetry by Zhukovsky, Batyushkov, Pushkin, Baratynsky, Yazykov, Tyutchev, Lermontov, Tolstoy, Pei, Nekrasov, and Solovyev.

856. Twentieth Century Russian Prose I
Winter of even-numbered years. 3(3-0)
Modernist trends in Russian prose before 1917.

860. Graduate Reading Course
Fall, Winter, Spring. 1 to 5 credits. May reenroll for a maximum of 18 credits.
Supervised reading course for investigation of special fields in Russian literature.

899. Master's Thesis Research
Fall, Winter, Spring. Variable credit.
Approval of department.

981. Seminar in Slavic Studies
Fall, Winter, Spring. 3(3-0) May reenroll for a maximum of 18 credits.
A particular writer, a major work, or a limited theme is chosen for intensive analysis.

999. Doctoral Dissertation Research
Fall, Winter, Spring, Summer. Variable credit.
Approval of department.

LYMAN BRIGGS SCHOOL — Descriptions of Courses

111. College Algebra
Fall. S(5-0) Placement Test or approval of school. 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. S(5-0) LBS 111 or MTH 109; LBS 124 concurrently. Not open to students with credit in MTH 111.
Theory and applications of derivatives to polynomials, rational functions, trigonometric functions and their inverses. Definition and properties of the definite integral. Numerical approximations of definite integrals.

124. APL-Computer Programming for Scientists
Fall, Winter, Spring. 3(3-0) LBS 112 or concurrently. Interdepartmental with Department of Computer Science.
APL programming: interactive programming techniques; arithmetic, logical, and extended APL operators; functions; applications to concurrent topics in mathematics; principles of operation of time shared computers.

131. Science and Technology Studies: Writing I
Fall, Winter, Spring. 4(4-0)
Instruction and practice in expository writing. Paper and report topics on science, technology and human values in Western civilization.

140. Biology I
Fall, Winter. 4(3-3) Not open to students with credit in B S 213.
Organismal biology. Basic principles of genetics, evolution, systematics, populations and ecology.

141. Biology II
Winter, Spring. 4(3-3) LBS 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
Spring. 1 to 2 credits. May reenroll for a maximum of 4 credits. LBS 140.
Selected problems such as analysis of biological data, interspecific and intraspecific competition, microorganisms inhabiting leaf litter, spring flora, diversity, stability and evolution of natural communities.

161. Introduction to Chemistry and Physics I
Fall. S(4-0) MTH 109 or MTH 111 or LBS 111L concurrently. LBS 111L or concurrently or approval of instructor.
Cases and gas laws, kinetic theory, heat and thermodynamics. Equilibria, solutions, acids and bases, ionization and electrolysis.

161L. Introductory Chemistry Laboratory
Fall. 1(0-3) LBS 110 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) LBS 161; LBS 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) LBS 162 or concurrently or approval of instructor.
Introduction to techniques and instruments in the physics laboratory. Selected experiments in classical and modern physics.

163. Introduction to Chemistry and Physics III
Spring. 3(4-0) LBS 162; LBS 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) LBS 163 or concurrently or approval of instructor.
Continuation of LBS 161.

216. Calculus II
Fall, Winter, Spring. 5(5-0) LBS 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's theorem and extreme points.

217. Calculus IV
Fall, Winter. 5(5-0) LBS 216. Credit may not be earned in both LBS 217 and MTH 311.

232. Science and Technology Studies: Writing II
Fall, Winter, Spring. 4(4-0) LBS 131; sophophora.
A writing course emphasizing investigative expository papers. Paper and report topics drawn from readings in the history and philosophy of science and technology, and other areas of science technology studies.
233. Science and Technology Studies: Special Topics

Fall, Winter, Spring. 1 to 2 credits.
May reenroll for a maximum of 6 credits. LBS 232.
Guided study of relations between the humanities and sciences. Students submit written work.

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

242. Biology III

Fall, Spring. (3-3) LBS 141. Not open to students with credit in B S 212.
Organizational growth and development of molecular genetics through life cycles of selected plant and animal species.

256. Energy Consumption and Environmental Quality (N)
Spring. 4(4-0) Interdepartmental with and administered by Physics.
The role of energy as a fundamental pollutant will be discussed along with the availability of fossil energy sources. Limitations on the safe utilization of both fossil and nuclear energy will also be considered.

261. Introduction to Chemistry and Physics IV
Fall. 3(4-0) LBS 163; LBS 261L. LBS 261L or concurrently or approval of instructor; LBS 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. (0-3) LBS 261 or concurrently or approval of instructor.
Continuation of LBS 163L.

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

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

263. Introduction to Chemistry and Physics VI
Spring. 3(4-0) LBS 261; LBS 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) LBS 263 or concurrently or approval of instructor.
Continuation of LBS 261L.

290. Directed Study
Fall, Winter, Spring. 1 to 6 credits.
May reenroll for a maximum of 6 credits. LBS 232.
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—Computer Science

D. Directed Study—Science

295. Independent Study
Fall, Winter, Spring. 1 to 4 credits.
May reenroll for a maximum of 12 credits. Approval of school.
Student conceived individual courses of study in curricular areas. Preliminary faculty approval and continuing guidance.

A. Independent Study—Biology

B. Independent Study—Science

361. Philosophy of Technology
Winter. 4(4-0) Sophomores 261L or approval of school. 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.

373. Introduction to the Philosophy of Science
Winter. 4(4-0) Juniors or approval of school.
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. 4(4-0) LBS 371. LBS 163 or concurrently or approval of instructor.
Interdepartmental with the Department of History.
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 ideals, etc.

375. Historical Problems in the Physical Sciences
Spring. 4(4-0) Juniors or approval of school.
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 ideals, etc.

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

377. The Natural Environment: Perceptions and Practices
Fall. 4(4-0) Sophomores. Interdepartmental with American Studies.
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 school. Interdepartmental with American Studies.
Interrelationships among elements of mass culture and technical change. Introduction to relevant research methods.

380. Energy Issues
Fall. 4(4-0) Juniors or approval of school.

409. History of Modern European and American Medicine
Spring. odd-numbered years. 4(4-0) Juniors. Interdepartmental with and administered by the Department of History.
Ancient and medieval background, socio-economic and intellectual historical contexts, the clinical perspective, sectarian competition, institutionalization of scientific medicine, and comparative health policies and systems.

454. Philosophy of Biological Sciences
Spring. 4(4-0) Nine credits in science or approval of school. 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 12 credits. Juniors and approval of school.
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—Science and Technology Studies

491. Senior Seminar I
Fall, Winter, Spring. 4(4-0) Seniors or approval of school.
Selected problems in the study of science and technology as human activities, using philosophical, historical, literary, social science or interdisciplinary perspectives or methods. Thesis topic refined and outlined.

492. Senior Seminar II
Fall, Winter, Spring. 4(4-0) LBS 491 or written approval of instructor.
Research, write, defend and evaluate a significant thesis paper in science and technology studies or related interdisciplinary science problems.

493. Field Experience
Fall, Winter, Spring. 1 to 15 credits.
May reenroll for a maximum of 18 credits. Approval of school.
Experiential learning related to the public or private practice of science and technology.
495. Independent Study  
Fall, Winter, Spring. 1 to 12 credits. May enroll for a maximum of 12 credits. Juniors and approval of school.  
student conceived individual courses of study in curricular areas. Preliminary faculty approval and continuing guidance.  
A. Independent Study—General  
B. Independent Study—Biology  
E. Independent Study—Science and Technology Studies

MANAGEMENT MGT

College of Business and Graduate School of Business Administration

302. Organization and Management  
Fall, Winter, Spring, Summer. 4(4-0) Junior Business majors; EC 201, ACC 201.  
Executive roles and functions in the business enterprise and other goal directed institutions; organization design; organization/employment interaction; analysis of internal organization structure; leadership, motivation, conflict, organization change and development.

303. Materials and Logistics Management  
Fall, Winter, Spring, Summer. 4(4-0) Junior to the approval of department. Interdepartmental with the Department of Marketing and Transportation Administration.  

304. Operations Planning and Control  
Winter, Spring, 4(4-0) MGT 303 or approval of department. Interdepartmental with the Department of Marketing and Transportation Administration.  
Managing the production system. Product development: process selection, facilities location and layout; staffing; materials, cost and quality control.

305. Purchasing Management  
Fall, Winter, Spring. 4(4-0) MGT 303 or approval of department. Interdepartmental with the Department of Marketing and Transportation Administration.  

306. Analysis of Processes and Systems  
Fall, Winter, Spring. 4(4-0) CPS 115, 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. The course considers techniques of criteria for efficiency and optimization, and program planning.

310. Fundamentals of Personnel Management  
Fall, Winter, Spring, Summer. 4(4-0) Juniors.  
Formulation and administration of employee relations policies in the business enterprise; human resource utilization; introduction to personnel staffing, training and development, performance appraisal, compensation, and labor relations.

341. Transportation Systems  
Fall, Winter. 4(4-0) MGT 303 or MTA 301. Interdepartmental with and administered by the Department of Marketing and Transportation Administration.  
Application of economic and business principles to the design and implementation of transportation systems: functional analysis of all major transport modes. Identification of major issues, analysis of alternatives and discussion of probable future outcomes.

345. Physical Distribution and Channel Strategy  
Fall, Winter. 4(4-0) MGT 303 or MTA 301. Interdepartmental with and administered by the Department of Marketing and Transportation Administration.  
Micro analysis of private and public physical distribution channel systems. Emphasis on the physical and behavioral components of the channel including analytical tools used in planning, implementing and controlling the system.

403. Research and Negotiation for Purchasing Materials and Management  
Fall, Winter, Spring. 4(4-0) MGT 305 or approval of department. Interdepartmental with the Department of Marketing and Transportation Administration.  
Applied research and planning focusing on the purchasing and materials management functions in organizations. Preparation for and conducting purchase negotiations. Field research studies. Administration of the research and planning effort.

405. Operations Management Topics  
Fall, Winter, Spring. 4(4-0) MGT 304 or approval of department. Interdepartmental with the Department of Marketing and Transportation Administration.  
Consideration of current and controversial questions in operations management. Field experience in study operations and policies in business. Industry studies; impact of new technology and government regulations.

407. Materials and Logistics Policy  
Winter, Spring. 4(4-0) MGT 303 plus 12 credits in MLM Program. Interdepartmental with and administered by the Department of Marketing and Transportation Administration.  
Analysis of comprehensive cases incorporating topical coverage of the entire materials and logistics management program.

409. Business Policy  
Fall, Winter, Spring, Summer. 4(4-0) Seniors in business administration, MGT 302; FT 391; MTA 306.  
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 common problem areas across the major functions within business organizations. Team and individual reports are required.

411. Staffing the Organization  
Fall, 4(4-0) MGT 310; MTA 317.  
Job design; job analysis; employment planning; recruitment, selection, and placement; employment interviewing and testing; validation of selection procedures; affirmative action constraints; EEOC guidelines; induction and orientation of employees.

412. Appraisal, Compensation and Benefits  
Winter. 4(4-0) MGT 310.  
Wage and salary administration; job evaluation; employee motivation; performance appraisal; relating pay to performance; financial and non-financial incentives; equity considerations; employee benefits.

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.

415. Managerial Approaches to Collective Bargaining  
Winter, Spring. 4(4-0) MGT 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, Winter, Spring. 4(4-0) Senior majors or approval of department. Interdepartmental with 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.

419. Group Dynamics and Organization Development  
Spring. 4(4-0) MGT 302. Students may not receive credit in both MGT 419 and PST 358.  
Group dynamics and development: organizational diagnosis; assessment of work attitude and organization climate; organization development goals and methods; action research, survey feedback, team building, conflict management, evaluating organization development activities.

426. Personnel Training and Individual Development  
Fall. 4(4-0) MGT 310.  
The training and development function; career stages and career planning; needs analysis; training and individual development techniques; evaluation of training and employee development programs.

442. Traffic and Transportation Management  
Winter. Spring. 4(4-0) MGT 303; MTA 341, MTA 345. Interdepartmental with and administered by the Department of Marketing and Transportation Administration.  
Basic practices related to purchasing and operating transportation services for private and public enterprises.