

ecosystems including streams, rivers, ponds and lakes. Topics include the geomorphology of inland waters, thermal stratification, nutrient cycles, community metabolism, plankton community dynamics, seasonal succession and eutrophication resulting from human activities. Weekly laboratory meetings provide hands-on experience with the field techniques of freshwater scientists. Prerequisites for Biology major: BIO 221, 222; CHM 111, 112, 113, 114. Prerequisites for Environmental Studies major: BIO 112, 114, 215; CHM 111,112, 113, 114. Junior standing or consent of instructor. Offered spring of even-numbered years.

BIO 452. GENERAL ECOLOGY **4 sh**

Students explore ecological principles at population, community and ecosystem levels in this study of the interrelationships of organisms with their biotic and abiotic environments. Three lecture hours, one laboratory per week. Prerequisites for Biology major: BIO 221, 222; CHM 111, 112, 113, 114. Prerequisites for Environmental Studies major: BIO 112, 114, 215; CHM 111,112, 113, 114. Junior standing or consent of instructor. Offered fall.

BIO 462. SENIOR SEMINAR **2 sh**

This course provides students with the opportunity to conduct both individual and group literature research projects of their own choosing based on recently published scientific papers. Students participate in group discussions of the current literature, research and write a scientific review paper, and develop a formal oral presentation. Recommended for senior year. Offered fall.

BIO 471. SPECIAL TOPICS SEMINAR **2-4 sh**

Each seminar – a nonlaboratory discussion course for biology majors – focuses on one biological topic determined by student and faculty interest. Must have instructor’s consent.

BIO 481. INTERNSHIP IN BIOLOGY **1-4 sh**

Advanced-level work experience in a biological field is offered on an individual basis when suitable opportunities can be arranged. Prerequisite: permission of department.

BIO 499. RESEARCH **1-4 sh**

Students from all levels conduct laboratory and/or field research under the direction of the Biology faculty. Maximum eight semester hours total credit. Prerequisite: permission of the biology faculty.

Business Administration

The Martha and Spencer Love School of Business mission statement:

“To provide instruction and experiences for our students so they graduate with the knowledge, skills and character essential for responsible business leadership in the 21st century.”

Chair, Department of Business Administration: Assistant Professor Valle

Professors: Burbridge, Honeycutt, Noer, Weavil

Associate Professors: Baxter, Burpitt, O’Mara, Paul, Powell, Schuette, Stevens, Strempek

Assistant Professors: Buechler, Cort, Hodge, Manring, Nienhaus, Yap

Instructor: Sims

The study of Business Administration at Elon University begins with a solid grounding in the traditional liberal arts and sciences. This preparation is an integral part of becoming an informed, responsible and capable business leader. An Elon education emphasizes the development of the whole person – mind, body and spirit. Business Administration courses at Elon University advance that commitment by emphasizing business knowledge acquisition, skill development through hands-on learning and experiential activities, and the development of discipline, integrity and an ethic of service.

Students majoring in Business Administration at Elon University take courses in a common core representing the functional business disciplines (e.g., accounting, finance, management, marketing, MIS, etc.). They also have the opportunity to develop specialized knowledge in one of five areas of concentration: Finance, International Business, Management, Management Information Systems and Marketing.

Our coursework emphasizes active learning and appreciative inquiry. Rather than dictate a set of principles to be memorized, our programs emphasize the integration of business knowledge and the application of that knowledge to organizational problems. We emphasize hands-on learning through internships, co-op experiences, service learning and classroom instruction which engages students in the study and practice of business. Students also develop skills in written and oral communications, team-building and problem solving, and decision making in our increasingly global business environment.

The Bachelor of Science in Business Administration (BSBA) program at Elon University emphasizes academic challenge, mature intellectual development and a lifetime of learning. Our graduates go on to leadership positions in business and industry in for-profit and not-for-profit organizations. Our graduates are prepared for a variety of assignments because they possess an extensive array of knowledge, skills and abilities.

A major in Business Administration requires the following:

At least 50% of the business credit hours required for the degree (B.S. in Business Administration) must be earned at Elon University.

MTH 116	Applied Mathematics with Calculus	4 sh or
MTH 121	Calculus and Analytic Geometry I	
ECO 201	Principles of Economics	4 sh
ECO 203	Statistics for Decision Making	4 sh
ECO 301	Business Economics	4 sh
ACC 201	Principles of Financial Accounting	4 sh
ACC 212	Principles of Managerial Accounting	4 sh
CIS 211	Management Information Systems	4 sh
BUS 202	Business Communications	4 sh
BUS 221	Legal Environment of Business	2 sh
BUS 311	Principles of Marketing	4 sh
BUS 323	Principles of Management and Organizational Behavior	4 sh
BUS 326	Operations Management	4 sh
BUS 465	Business Policy	4 sh
FIN 343	Managerial Finance	4 sh
Sixteen to twenty-two semester hours of a concentration		16-22 sh
TOTAL		70 -76 sh

Concentrations

Finance

16 sh

One course from the following:

One 300/400 level course from the Liberal Studies course offerings (Expression, Civilization, Society or Science). The 300/400 level Liberal Studies course selected **must be taken in addition to** the upper-level GST and Advanced Study courses already required, and it may not also count for any other course in the student's

program of study. Advisors may assist students in selection of an appropriate course which should enhance the subject matter of the student's concentration.

- FIN 413 Advanced Managerial Finance
- FIN 421 Investment Principles
- FIN 471 Seminar: Special Topics

Marketing

16 sh

One course from the following:

One 300/400 level course from the Liberal Studies course offerings (Expression, Civilization, Society or Science). The 300/400 level Liberal Studies course selected **must be taken in addition to** the upper-level GST and Advanced Study courses already required, and it may not also count for any other course in the student's program of study. Advisors may assist students in selection of an appropriate course which should enhance the subject matter of the student's concentration.

- BUS 415 Buyer Behavior
- BUS 416 Global Marketing

One course from the following:

- BUS 413 Integrated Marketing Communications
- BUS 414 Marketing Research
- BUS 417 Marketing Channels
- BUS 419 Sales Management

Management

16 sh

One course from the following:

One 300/400 level course from the Liberal Studies course offerings (Expression, Civilization, Society or Science). The 300/400 level Liberal Studies course selected **must be taken in addition to** the upper-level GST and Advanced Study courses already required, and it may not also count for any other course in the student's program of study. Advisors may assist students in selection of an appropriate course which should enhance the subject matter of the student's concentration.

Three courses from the following:

- BUS 424 Responsible Leadership
- BUS 425 Human Resource Management
- BUS 427 Organizational Improvement
- BUS 428 Advanced Organizational Behavior
- BUS 429 Entrepreneurship/Intrapreneurship
- BUS 430 International Business Management
- BUS 471 Seminar: Special Topics in Management

International Business

16 sh

Two of the four courses that constitute the concentration are required:

- BUS 416 Global Marketing
- BUS 430 International Business

Two 300/400 level courses should be selected from outside Business Administration. At least one of these must be from the Liberal Studies course offerings (Expression, Civilization, Society, or Science). These courses must be taken in addition to the upper level GST and Advanced Study courses already required, and may not also count for any other courses in the student's program of study. Advisors may assist students in the selection of appropriate courses which should enhance the subject matter of the IB Concentration. Courses selected are subject to approval by the IB coordinator.

Intermediate proficiency in a modern foreign language is a concurrent requirement of the concentration. Proficiency can be demonstrated either by achieving an intermediate-mid level rating on an Oral Proficiency Interview (OPI) or a Simulated Oral Proficiency Interview (SOPi), by passing a modern foreign language course at the 210 level, or by placement in the language at or above the 210 level.

Management Information Systems **20-22 sh**

One 300/400 level course from the Liberal Studies course offerings (Expression, Civilization, Society or Science). The 300/400 level Liberal Studies course selected **must be taken in addition** to the upper-level GST and Advanced Study courses already required, and it may not also count for any other course in the student's program of study. Advisors may assist students in selection of an appropriate course which should enhance the subject matter of the student's concentration.

- CIS 216 Programming in a Visual Environment
- CIS 114 Web Site Development (or proficiency)
- CIS 465 MIS Strategies for e-Business

Choose two of the following courses:

- CIS 330 Systems Analysis and Design
- CIS 325 Web Publishing Technology
- CIS 335 Data Management and Analysis

A minor in Business Administration requires the following courses:

BUS	304	Introduction to Marketing	4 sh or
BUS	311	Principles of Marketing (prerequisite BUS 202)	
BUS	303	Introduction to Managing	4 sh or
BUS	323	Principles of Management and Organizational Behavior (prerequisite BUS 202)	
ACC	201	Principles of Financial Accounting	4 sh
ACC	212	Principles of Managerial Accounting	4 sh
ECO	201	Principles of Economics	4 sh
TOTAL			20 sh

BUS 202. BUSINESS COMMUNICATIONS **4 sh**

In addition to studying the theory and principles of good oral and written communications, students practice making oral presentations and writing business reports, letters and memoranda. Prerequisites: ENG 110 and sophomore standing. Offered fall and spring.

BUS 221. LEGAL ENVIRONMENT OF BUSINESS **2 sh**

A number of laws influence business decisions and activities. Matters relating to competitive conduct, consumer protection, accounting and financial reporting, public communications and the natural environment are regulated by widely known federal agencies. Most states also have counterpart commissions that set additional standards and rules for business regulation. U.S. businesses enjoy a remarkably free legal environment compared to many other developed markets, and certainly more free than centrally controlled economic systems. This course explores these aspects of the U.S. business scene, with comparisons across states and other nations where appropriate. Its focus is on the legal environment, not on the legal processes, torts or case law. Its appropriate audience is the business student who needs a broad, general understanding of how we govern ourselves in the marketplace. Offered fall and spring.

BUS 303. INTRODUCTION TO MANAGING **4 sh**

For non majors and business administration minors, this introductory course examines universal business processes – such as goal setting, planning, decision making, motiva-

tion, human resource management and control which are utilized by both not-for-profit and government organizations. Sophomore standing required. No credit for both BUS 303 and BUS 323. Offered fall, winter and spring.

BUS 304. INTRODUCTION TO MARKETING **4 sh**

For non majors and business administration minors, this introductory course examines marketing principles which are applied by all organizations. Sophomore standing required. No credit for both BUS 304 and BUS 311. Offered fall, winter and spring.

BUS 311. PRINCIPLES OF MARKETING **4 sh**

This study of the marketing and distribution of goods and services includes buyer behavior, the marketing functions, commodity and industrial markets, merchandising considerations, price policies and governmental regulation of competition. Prerequisites: ECO 201 and BUS 202. Sophomore standing required. No credit for both BUS 304 and BUS 311. Offered fall and spring.

BUS 323. PRINCIPLES OF MANAGEMENT AND ORGANIZATIONAL BEHAVIOR **4 sh**

This course will prepare the student for the challenges of management and leadership in the dynamic new workplace of the 21st century. The course examines the central role of management in the efficient and effective production of goods and services. Students will learn how strategic and operational planning, job and organizational structure design and human behavior affect operations in manufacturing and service industries. Organizational behavior topics include leadership and ethics, motivation and rewards, communication and teams, and teamwork. The global dimensions of management are also emphasized. Prerequisite: BUS 202. Sophomore standing required. No credit for both BUS 303 and BUS 323. Offered fall and spring.

BUS 326. OPERATIONS MANAGEMENT **4 sh**

As a primary business function, operations plays a vital role in achieving a company's strategic plans. Since the operations function produces the goods and services, it typically involves the greatest portion of the company's people and capital assets. Customer service, product/service delivery, product/service quality and overall organizational effectiveness depend on excellence in operations. This course covers manufacturing and service process design, planning and control. Operations strategy, demand forecasting, supply chain management, facility location and design, e-commerce, capacity planning, inventory systems, scheduling and quality control are topics included in the course. Prerequisites: ECO 203, CIS 211, BUS 323 or 303. Sophomore standing required. Offered fall and spring.

BUS 365. BUSINESS ADMINISTRATION APPLICATIONS **4 sh**

Topics vary yearly in the study of applications of business administration principles and theories in various business situations. Sophomore standing required.

BUS 366. FIELD EXPERIENCE IN BUSINESS **4 sh**

This course revolves around visits to diverse local businesses and analyses of the businesses visited. Prerequisite: permission of instructor. Sophomore standing required.

BUS 413. INTEGRATED MARKETING COMMUNICATIONS **4 sh**

This course focuses on the management of the communication aspects of marketing strategy. Elements of advertising, personal selling, sales promotion, direct marketing and public relations are included. The study of marketing communications includes a review of concepts from economics, behavioral sciences and social sciences, which play a role in creating, executing and evaluating promotional programs. Topics include setting communications objectives and budgets, media planning, and creative strategy, all in the context of an integrated communication program. Emphasis will be placed on appreciating the scope, strengths and weaknesses of these marketing communication tools, and particularly on how they can and should be used together. Prerequisite: BUS 311. Offered spring.

BUS 414. MARKETING RESEARCH **4 sh**

Students apply various research methods used in business to gather and analyze market-

ing data. Possible effects and implications of the analyses are discussed in terms of the marketing and decision-making processes of businesses. Prerequisites: BUS 311 and ECO 203. Offered fall.

BUS 415. BUYER BEHAVIOR

4 sh

This required course for the marketing concentration focuses on the application of the behavioral sciences to understanding buyer behavior. Emphasis will be placed on developing an appreciation for the scope of the topic, understanding the essentials underlying buyer behavior and developing the ability to relate such understanding to important issues faced by marketing practitioners. Traditional research-oriented topics will include perception, memory, affect, learning, persuasion, motivation, behavioral decision theory and environmental (e.g., social and cultural) influences. All topic presentations will also include a discussion of practitioner-oriented managerial implications. Prerequisite: BUS 311. Offered fall and spring.

BUS 416. GLOBAL MARKETING

4 sh

This required course for the marketing concentration is designed to explore the scope of global marketing. The course examines the impact the global environment has upon marketing decisions and strategy formulations. Through analyses of different types of markets, students will develop an understanding and appreciation of how the world is “shrinking” and the influence this has on U.S. businesses, individuals, households and institutions. Students will monitor the global environment and report their findings on specific regions of the world to the class. The intent is to make students more aware of the global environment and its impact on U.S. businesses. Prerequisite: BUS 311. Offered fall and spring.

BUS 417. MARKETING CHANNELS

4 sh

Of the four major areas of marketing strategy (product, pricing, advertising and promotion, and distribution), the distribution of goods and services through multiple channels requires the greatest understanding of business-to-business marketing. The study of channel strategies gives the student an opportunity to combine knowledge of many marketing principles with that of other business disciplines (accounting, finance, management) in structuring the distribution networks to move products from producer to ultimate customer. Business-to-business relationship, problems and interfaces are explored using the case method with emphasis on channel management, performance and strategy. Prerequisite: BUS 311. Offered spring.

BUS 419. SALES MANAGEMENT

4 sh

The sales management course is an analysis of professional selling practices with emphasis on the selling process and sales management, including the development of territories, determining potentials and forecasts, and setting sales quotas. Prerequisite: BUS 311. Offered fall.

BUS 424. RESPONSIBLE LEADERSHIP

4 sh

This course addresses the characteristics, behaviors and responsibilities required of contemporary organizational leaders. While focusing on the traditional topics (individual differences and traits of leaders, behaviors of leaders, role of power, types and styles of leadership, and theories of motivation), the student will also be introduced to some nontraditional approaches (nontraditional metaphors, leadership as an art and individual differences of followers and followership) to understanding leaders and leadership. The responsibilities of leadership will be specifically addressed in relationship to the concepts of organizational success and effectiveness, social responsibility and ethical decision-making. Prerequisite: BUS 323. Offered fall and spring.

BUS 425. HUMAN RESOURCE MANAGEMENT

4 sh

Effective human resource management is critical to the long-term value of an organization and ultimately to its success and survival. All aspects of human resource management – including how organizations interact with the environment; acquire, develop and compensate human resources; design and measure work – can help organizations meet their competitive challenges and create value. This course looks at the role of strategic human resource planning, recruitment and selection, performance management, devel-

oping and compensating human resources, the legal environment and employee relations, collective bargaining and labor relations, using technology to increase HRM effectiveness and global issues in HRM. Prerequisite: BUS 323. Offered fall.

BUS 427. ORGANIZATIONAL IMPROVEMENT **4 sh**

This course will introduce the students to material which will cover basic productivity improvement techniques, application of these techniques in his/her work place, teaching coworkers these techniques, leading work teams in problem-solving activities and managing an organizational productivity improvement program. Prerequisite: BUS 323. Offered spring.

BUS 428. ADVANCED ORGANIZATIONAL BEHAVIOR **4 sh**

This course addresses the impact of individual, group and organizational influences in human behavior within organizations. Building on the organizational behavior topics introduced in BUS 323, the focus of this course is on acquiring in-depth knowledge and developing interpersonal skills through the study and application of theories and concepts related to understanding and predicting human behavior in organizations. Personality, perception, job design and goal setting, appraisal, group dynamics, decision-making, cooperation and conflict, organizational structure and culture, power and organizational politics, organizational learning, innovation and change management, and organizational development are topics included in the course. Prerequisite: BUS 323. Offered fall and spring.

BUS 429. ENTREPRENEURSHIP/INTRAPRENEURSHIP **4 sh**

This course addresses how to go into business and several of the unique problems and circumstances encountered in establishing and operating a small business. Emphasis is also placed on the role of entrepreneurship in large firms through the study of "intrapreneurship." Special emphasis focuses on why small businesses fail and what entrepreneurs can do to minimize the influence of these forces. Family-owned business management is included as one type of small business covered. Prerequisite: BUS 323.

BUS 430. INTERNATIONAL BUSINESS MANAGEMENT **4 sh**

This course covers business management from the perspective of the current global business environment. Students examine the overall nature of international business, the foreign environments that international businesses face and the unique situations associated with doing business across international borders. Prerequisite: BUS 323. Offered fall and spring.

BUS 465. BUSINESS POLICY **4 sh**

This capstone course integrates students' experiences and previous study through case studies and simulated business decision exercises. Prerequisites: BUS 202, 311, 323, 326; ECO 301; FIN 343; and senior status. Offered fall and spring.

BUS 471. SEMINAR: SPECIAL TOPICS IN MANAGEMENT **4 sh**

This advanced study consists of readings and discussion of special topics and involves participation by students, faculty and other resource persons.

BUS 472. SEMINAR: SPECIAL TOPICS IN INTERNATIONAL BUSINESS **4 sh**

This advanced study consists of readings and discussion of special topics and involves participation by students, faculty and other resource persons.

BUS 481. INTERNSHIP IN BUSINESS ADMINISTRATION **1-8 sh**

An internship experience offers the student valuable experience in business and management. Appropriate placement must be arranged by the student with the help and support of business administration faculty and other appropriate resources.

BUS 491. INDEPENDENT STUDY **1-4 sh**

BUS 499. UNDERGRADUATE RESEARCH IN BUSINESS ADMINISTRATION **1-4 sh**

Students may engage in an undergraduate research study in collaboration with a faculty sponsor.

Chemistry

Chair, Department of Chemistry: Professor E. Grimley

Professor: Danieley, Gooch

Associate Professors: Sienerth, Wright

Assistant Professors: Karty, J. Grimley

Adjuncts: Bernhardt, Bowling, Keane

Science Lab Manager: Weller

The Department of Chemistry offers courses of study leading to either a bachelor of science degree (61–65 semester hours), bachelor of arts degree (44–48 semester hours) or a minor in chemistry (24 semester hours). Students satisfying the requirements of the bachelor of science degree will be certified by the American Chemical Society.

Students who major in chemistry are qualified for many pursuits. They may choose to: work in the chemical industry; continue advanced studies in chemistry; take professional training in medicine, dentistry or other health-related fields; prepare to teach at the secondary level or pursue opportunities in related fields (environmental science, forensics, business and industry).

Elon's chemistry program provides the opportunity for students to engage with faculty in undergraduate research and to gain direct experience with new instrumentation using today's state-of-the-art technology. The results of the research projects are presented at local, regional and national scientific meetings.

Another key feature of the program is the introduction and use of instrumentation in the first-year general chemistry sequence and its continued emphasis throughout the chemistry curriculum. Student participation in assisting in laboratory and recitation instruction is strongly advised and supported.

A Bachelor of Science (ACS certified) degree in Chemistry requires the following courses:

CHM 111	General Chemistry I	3 sh
CHM 113	General Chemistry I Lab	1 sh
CHM 112	General Chemistry II	3 sh
CHM 114	General Chemistry II Lab	1 sh
or (in lieu of CHM 111, 113, 112, 114)		
CHM 115	Advanced General Chemistry (3 sh)	
CHM 116	Advanced General Chemistry Lab (1 sh)	
CHM 211	Organic Chemistry I	3 sh
CHM 213	Organic Chemistry I Lab	1 sh
CHM 212	Organic Chemistry II	3 sh
CHM 214	Organic Chemistry II Lab	1 sh
CHM 125	Chemical Literature	1 sh
CHM 205	Inorganic Chemistry	4 sh
CHM 311	Quantitative Analysis	4 sh
CHM 321	Instrumental Analysis	4 sh
CHM 332	Physical Chemistry I	4 sh
CHM 334	Physical Chemistry II	4 sh
CHM 351	Biochemistry	3 sh

CHM 431	Advanced Inorganic Chemistry	4 sh
CHM 432	Physical Organic Chemistry	2 sh
CHM 461	Seminar	1 sh
CHM 499	Chemistry Research	2 sh
MTH 121	Calculus & Analytic Geometry I	4 sh
MTH 221	Calculus & Analytic Geometry II	4 sh
PHY 113	General Physics I with Calculus	4 sh
PHY 114	General Physics II with Calculus	4 sh
TOTAL		61-65 sh

A Bachelor of Arts degree in Chemistry requires the following courses:

CHM 111	General Chemistry I	3 sh
CHM 113	General Chemistry I Lab	1 sh
CHM 112	General Chemistry II	3 sh
CHM 114	General Chemistry II Lab	1 sh
or (in lieu of CHM 111, 113, 112, 114)		
CHM 115	Advanced General Chemistry (3 sh)	
CHM 116	Advanced General Chemistry Lab (1 sh)	
CHM 211	Organic Chemistry I	3 sh
CHM 213	Organic Chemistry I Lab	1 sh
CHM 212	Organic Chemistry II	3 sh
CHM 214	Organic Chemistry II Lab	1 sh
CHM 125	Chemical Literature	1 sh
CHM 205	Inorganic Chemistry	4 sh
CHM 311	Quantitative Analysis	4 sh
CHM 332	Physical Chemistry I	4 sh
CHM 461	Seminar	1 sh
MTH 121	Calculus & Analytic Geometry I	4 sh
PHY 111	General Physics I	4 sh
PHY 112	General Physics II	4 sh
(Physics 113 and 114 may be substituted for Physics 111 and 112.)		
Six additional semester hours selected from other courses of which		
4 semester hours must be from 300-400 level courses including CHM 321,		
CHM 351/352 and CHM 499.		
TOTAL		44-48 sh

A minor in Chemistry requires the following courses:

CHM 111	General Chemistry I	3 sh
CHM 113	General Chemistry I Lab	1 sh
CHM 112	General Chemistry II	3 sh
CHM 114	General Chemistry II Lab	1 sh
or (in lieu of CHM 111, 113, 112, 114)		
CHM 115	Advanced General Chemistry (3 sh)	
CHM 116	Advanced General Chemistry II Lab (1 sh)	
CHM 211	Organic Chemistry I	3 sh
CHM 213	Organic Chemistry I Lab	1 sh
CHM 212	Organic Chemistry II	3 sh

CHM 214	Organic Chemistry II Lab	1 sh
Eight to 12 additional hours to fulfill the requirement of at least 24 semester hours for the minor selected from:		8-12 sh
CHM 205	Inorganic Chemistry (4 sh)	
CHM 305	Environmental Chemistry (4 sh)	
CHM 311	Quantitative Analysis (4 sh)	
CHM 321	Instrumental Analysis (4 sh)	
CHM 351	Biochemistry (3 sh) and	
CHM 352	Biochemistry Lab (1 sh)	
CHM 471-79	Special Topics in Chemistry (2-4 sh)	
TOTAL		24 sh

A Bachelor of Arts Degree in Chemistry/Chemical Engineering: See requirements listed in Engineering.

CHM 101. BASIC CONCEPTS IN CHEMISTRY **3 sh**

The course is designed to meet the math/science general studies requirement for non-science majors. The material covered includes atomic structure, chemical changes, descriptive chemistry of selected elements, introduction to organic chemistry, and how chemistry applies to consumer products and the environment. No credit given to students with prior credit for CHM 111. No credit for major/minor. Corequisite: CHM 102. Offered fall, winter, spring.

CHM 102. BASIC CONCEPTS IN CHEMISTRY LABORATORY **1 sh**

Laboratory exercises are based upon selected foundational concepts covered in CHM 101. No credit for students with prior credit for CHM 113. No credit for major/minor. Corequisite: CHM 101. Offered fall, winter, spring.

CHM 111. GENERAL CHEMISTRY I **3 sh**

This course introduces fundamental principles of chemistry with special emphasis on developing skills in quantitative reasoning. Topics include stoichiometry, nomenclature, gases, atomic structure and periodicity, and thermochemistry. Prerequisite: High school chemistry. Corequisites: MTH 111 or higher and CHM 113. Offered fall and spring.

CHM 112. GENERAL CHEMISTRY II **3 sh**

The study of fundamental chemical principles continues with chemical kinetics, liquid/solid states, chemical equilibrium (gas phase and acid/base), nuclear chemistry and electrochemistry. Prerequisite: CHM 111. Corequisite: CHM 114. Offered spring.

CHM 113. GENERAL CHEMISTRY I LABORATORY **1 sh**

The experiments offered familiarize students with basic laboratory techniques and complement topics discussed in CHM 111. Corequisite: CHM 111. Offered fall and spring.

CHM 114. GENERAL CHEMISTRY II LABORATORY **1 sh**

This course involves laboratory applications of concepts and principles discussed in CHM 112. Prerequisites: CHM 111, 113. Corequisite: CHM 112. Offered spring and fall (for CHM 115 only).

CHM 115. ADVANCED GENERAL CHEMISTRY **3 sh**

This course explores fundamental principles of chemistry with an emphasis on understanding chemical concepts and quantitative reasoning. It consists of a brief review of stoichiometry, nomenclature, gases, thermochemistry, atomic structure and periodicity and more extensive coverage of chemical kinetics, electrochemistry, equilibrium systems, liquid/solid states and nuclear chemistry. This course is available for students who

scored 4 or 5 on the AP chemistry exam, and for students with exemplary scores on the Toledo exam. Prerequisites: High school chemistry. Corequisite: CHM 116. Offered fall.

CHM 116. ADVANCED GENERAL CHEMISTRY LAB **1 sh**

This course involves laboratory applications of concepts and principles discussed in CHM 115 including mass spectrometry, atomic spectroscopy, molecular modeling, stoichiometry, thermochemistry, chemical kinetics, electrochemistry, equilibrium systems, and liquid and solid states. Corequisite: CHM 115. Offered fall (for CHM 115 only).

CHM 125. CHEMICAL LITERATURE **1 sh**

This writing-intensive course is centered around an in-depth study of the different ways in which new discoveries in chemistry are communicated to members of the profession. Topics include primary and secondary sources: journals, monographs, patents, communications and reviews as well as foremost references such as Chemical Abstracts, The Ring Index and Science Citation Index. Both classical and online search methods will be integrated into the required writing assignments. Prerequisite: CHM 111. Offered spring.

CHM 205. INORGANIC CHEMISTRY **4 sh**

This course will be an introduction to the field of inorganic chemistry with emphasis on classical coordination chemistry, solid state chemistry, the periodic relationships of the elements, the origin of the elements, and the chemistry of hydrogen and oxygen. It will also serve as an introduction to the use of physical methods of structure determination of inorganic compounds by magnetic and spectral techniques including magnetic susceptibility, UV/VIS and IR spectroscopies, and NMR spectrometry. Prerequisites: CHM 112/114 or CHM 115/116. Offered spring.

CHM 211. ORGANIC CHEMISTRY I **3 sh**

Organic Chemistry introduces students to the chemistry of carbon compounds, including nomenclature, the influence of structure on physical/chemical properties, reaction mechanisms, stereochemistry, conformational analysis, synthesis and characteristic reactions of different organic compounds. Prerequisites: CHM 112/114 or 115/116. Corequisite: CHM 213. Offered fall.

CHM 212. ORGANIC CHEMISTRY II **3 sh**

Continuing the study of organic chemistry, this course emphasizes compounds containing oxygen or nitrogen and culminates with a survey of lipids, carbohydrates and proteins. Prerequisites: CHM 211/213. Corequisite: CHM 214. Offered spring.

CHM 213. ORGANIC CHEMISTRY I LABORATORY **1 sh**

Laboratory work includes determination of physical properties, separation of mixtures, some structure identification and synthesis of selected organic compounds. Prerequisites: CHM 112/114 or 115/116. Corequisite: CHM 211. Offered fall.

CHM 214. ORGANIC CHEMISTRY II LABORATORY **1 sh**

Procedures include microscale synthetic methods, molecular modeling via IBM-PC and qualitative organic analysis. Prerequisites: CHM 211, 213. Corequisite: CHM 212. Offered spring.

CHM 305. ENVIRONMENTAL CHEMISTRY **4 sh**

Environmental Chemistry provides a survey of chemical topics applying to selected pollutants in the air, water and soil. Such topics include production and diffusion, photochemical processes, techniques for analysis, acid-base and redox chemistry, environmental and biological effects. Laboratory work includes acid/base and buffer chemistry, analysis of heavy metal pollutants sampling techniques, and resistance of selected materials to certain pollutants. No credit toward B.S. degree. Prerequisites: CHM 211/213. Offered spring of alternate years.

CHM 311. QUANTITATIVE ANALYSIS **4 sh**

This course introduces chemical methods of quantitative analysis, including classical

volumetric and selected instrumental methods, a discussion of error and uncertainty in measurements, and elementary statistics. Discussion also covers the underlying physical and chemical theories and laws, with emphasis on chemical equilibrium. Prerequisites: CHM 111, 112, 113, 114. Offered fall.

CHM 321. INSTRUMENTAL ANALYSIS **4 sh**

Instrumental Analysis offers theory and practice of instrumental methods, with emphasis placed on spectroscopic (UV/Vis, IR, NMR, AA), mass spectrometric and radiochemical methods of analysis. Prerequisites: CHM 311, and CHM 211, 212, 213, 214. Offered spring.

CHM 332. PHYSICAL CHEMISTRY I **4 sh**

The mathematical development of the physical principles in chemistry is explored. Topics include development and application of the laws of thermodynamics, equations of states, kinetic molecular theory, elementary electrochemistry and equilibria. Laboratory experiments are designed to complement lectures and include studies of phase relationships, calorimetry and gas laws. Three hours lecture and three hours lab per week. Prerequisites: CHM 111-114 or CHM 115, 116; MTH 121; PHY 112 or 114. Offered fall.

CHM 334. PHYSICAL CHEMISTRY II **4 sh**

The principles of quantum mechanics are developed and illustrated by use of simple systems. Spectroscopic techniques are investigated as tools for probing structure and properties of molecules. Other topics include kinetics and group theory. Laboratory experiments are designed to complement lectures and include multiple techniques to investigate reaction kinetics, laser spectroscopy, UV-VIS spectroscopy and computational techniques. Three hours lecture and three hours lab per week. Prerequisites: CHM 332, MTH 221, PHY 114. Offered spring.

CHM 351. BIOCHEMISTRY **3 sh**

This is a survey of biochemistry as it relates to the physiology of organisms. Topics include biochemical methodology, buffers, proteins (structure, function and synthesis), enzymes, bioenergetics, anabolism and catabolism of carbohydrates and lipids and metabolic regulation. Prerequisites: CHM 211, 212, 213, 214. (CHM 351 is the same as BIO 351.) Offered fall.

CHM 352. BIOCHEMISTRY LABORATORY **1 sh**

This laboratory investigates the rates of enzyme-catalyzed reactions, including the effect of enzyme inhibitors; the isolation/purification/analysis of proteins, lipids and carbohydrates; and some analytical techniques used in clinical chemistry laboratories. Techniques employed include affinity chromatography, electrophoresis, gas chromatography, UV-visible spectrometry and polarimetry. Prerequisites: CHM 211, 212, 213, 214. Corequisite: CHM 351. (CHM 352 is the same as BIO 352.) Offered fall.

CHM 431. ADVANCED INORGANIC CHEMISTRY **4 sh**

This course will begin with an accelerated review of the history of inorganic chemistry, atomic structure and simple bond theory. It will then provide an in-depth introduction into symmetry and group theory with applications to the description of chemical bonding in molecular orbital theory. Acid-Base and Donor-Acceptor Chemistry and the descriptive chemistry of the main group elements will be followed by an in-depth survey of organometallic chemistry. The continued application of physical methods of structure determination of inorganic compounds by magnetic and spectral techniques including magnetic susceptibility, UV/Vis and IR spectroscopies and NMR spectrometry will be presented throughout the course. Prerequisite: CHM 205 and CHM 334. Offered fall.

CHM 432. PHYSICAL ORGANIC CHEMISTRY **2 sh**

The study and applications of Hückel molecular orbital theory toward the understand-

ing of the mechanisms of selected chemical reactions. The focus will be on empirical methods to derive mechanisms including linear free energy relationships and reaction kinetics. Techniques to be covered include photoelectron spectroscopy (PES) and computational chemistry (CC). Prerequisite: CHM 334.

CHM 461. SEMINAR **1 sh**

Students make presentations after they do individual library research. Student seminars are supplemented with seminars by practicing scientists. All chemistry-oriented students are encouraged to attend. Credit for junior and senior majors only or by permission of the instructor. Course is two semesters in length with 0.5 sh each semester. Students must take both semesters. Offered fall and spring.

CHM 471-479. SPECIAL TOPICS IN CHEMISTRY **2-4 sh**

Advanced topics offered to meet the needs and interests of students include methods in nuclear chemistry, nuclear magnetic resonance, advanced organic or polymer chemistry. Prerequisites: CHM 212/214.

CHM 481. INTERNSHIP **1-4 sh**

Students gain advanced level work experience in a chemical field. Internships are offered on an individual basis when suitable opportunities can be arranged. Prerequisite: permission of department.

CHM 491. INDEPENDENT STUDIES **1-4 sh**

CHM 499. RESEARCH **1-3 sh**

In collaboration with a chemistry faculty member, students undertake experimental or theoretical investigations. Prerequisite: Approval of department chair. Offered fall, winter, spring.

Classical Studies

Coordinator: Professor Gill

Classical Studies is an interdisciplinary program of studies in the languages, history, culture and heritage of the ancient and early modern world. This program gives students an opportunity for concentrated study of “Classical” ideas and practices, which form an important part of Western civilization. In addition, the program examines the ways that these ideas and practices have influenced, and been modified by, later generations. A minor in Classical Studies can serve as a valuable complement to many fields, providing depth and context for a student’s other courses, encouraging analytical study of primary sources and allowing the pleasure of reading some of Western civilization’s greatest works.

A minor in Classical Studies requires the following:

Twenty semester hours taken from the list below and/or from other approved courses. At least eight of these semester hours must be at or above the 300-level. Courses must be chosen from at least three departments.

Acceptable courses in Classical Studies include:

ART 220	Art and History: Prehistory to the Present	4 sh
ART 312	Studies in Art History (depending on appropriateness of topic)	2-4 sh
ART 343	Renaissance Art History	4 sh
CLA 210	Introduction to Classical Studies	4 sh