into why there is a need for financial planning and explains the process from the data gathering stage through to the monitoring of the final plan. The course focuses special attention on the retirement planning process including sources of retirement funds and evaluating the risk of clients outliving their resources. The course also explains the regulatory and ethical issues around financial planning. Prerequisite: Fundamentals of Investing and Risk Management and Insurance. 3 hours Lecture and discussion — 3 credits

BA 4236

Federal Income Tax
A study of the federal tax system, its history and significant federal legislation. The student reviews individual federal tax returns and tax planning procedures. The influence of taxes on business is also discussed. The student will prepare tax returns on a computer-based package. Prerequisites: Principles of Accounting I and II and Junior status. 3 hours Lecture and Discussion — 3 credits

BA 4239

International Trade
A study of the theory and practice of international trade and its application to current problems and policies, including such topics as tariffs, quotas, international payments, economic unions of foreign states, and foreign exchange. Prerequisite: Microeconomics, Principles of Marketing, Finance and Senior status and completion of all Business core courses or with permission of instructor. 3 hours Lecture and Discussion — 3 credits

BA 4241

Financing Sports Operations
A study of financial concepts and their application to the sports environment, including analysis of obtaining public funding through financing sports activities, selling and pricing of sports tickets, sale of licensed products and services, sale of concessions, and exploring types of sponsorship benefits. Prerequisites: Principles of Accounting I and II, Finance and Junior Status. 3 hours Lecture and Discussion — 3 credits

BA 4242

Cost Accounting
A study of the various factors in cost relationships that effectively aid management in the efficient operation of business enterprises. Budgets and cost reports for various levels of management. Prerequisites: Junior Status, Principles of Accounting I and II. 3 hours Lecture and Discussion — 3 credits

BA 4244

Management Seminar
Management Seminar is designed as an advanced capstone course for all business majors. This course represents an opportunity for all business majors to review, extend and apply all previous coursework completed in the business curriculum using strategic planning as a framework. This course will combine theory and practice, and will require active participation in a computer simulation game in which students will develop a cohesive strategy, formulate a business plan, “manage” a company, and report the results to a Board of Directors. Prerequisite: Senior Status. 3 hours Lecture and Discussion — 3 credits

BA 4247

Advertising
Planning, implementing, and evaluating advertising and sales promotion activities. Determining advertising objectives, selection of campaign themes and media, evaluating advertisements and campaigns, controlling advertising and promotion expenditures, the client-agency relationship, regulations and the social and economic effects of advertising. Prerequisite: Principles of Marketing. 3 hours Lecture and Discussion — 3 credits

BA 4565

Entrepreneurship in Practice
An advanced course in organizing and operating a small business. Case studies and real-world application of entrepreneurship will be examined and analyzed. Course emphasis is on the final development and refinement of the business plan. The student will present his/her fully developed business plan. Prerequisites: Entrepreneurship Finance and Law for the Entrepreneur. 3 hours Lecture and Discussion — 3 credits

Chemistry

CH 0011

Basic Chemistry
A non-credit lecture and laboratory course designed to prepare students for General Chemistry I and II. Energy, matter, and change with appropriate problem-solving applications will be emphasized. Formulas, equations, and descriptive chemistry will be covered in the laboratory. 3 hours Lecture and 3 hours Laboratory — 0 credits
Course Descriptions

CH 1001
Chemistry Fundamentals
This course presents basic chemical concepts to non-scientists. Students will gain the foundation of chemical knowledge so they can make informed personal and professional decisions. Lecture topics include structure, bonding and reactivity, water and solutions, and bio-organic and environmental chemistries. This course does not satisfy the requirement for General Chemistry I. 3 hours Lecture — 3 credits

CH 1001L
Chemistry Fundamentals Laboratory
Students will develop some familiarity with laboratory skills. This course is to be taken concurrently with or after having successfully completed the Chemistry Fundamentals lecture. 3 hours Laboratory — 1 credit

CH 1103
General Chemistry I
General Chemistry I is a course which introduces many of the basic principles of chemistry. Topics covered include atomic structure, periodic trends, molecular bonding and shapes, intermolecular forces and the properties of solutions. Also discussed are ionic and covalent compounds, the mole concept, chemical equations, stoichiometry, the major classes of chemical reactions, and thermochemistry. Prerequisite: high school chemistry. This course is to be taken concurrently with the General Chemistry I Laboratory. 3 hours Lecture — 3 credits

CH 1103L
General Chemistry I Laboratory
The experiments in the laboratory section are designed to reinforce the concepts discussed in lecture as well as to develop basic laboratory skills. Topics covered include unit conversion and nomenclature, redox and precipitation reactions, stoichiometry, calorimetry, titrations and molecular structure. This course is to be taken concurrently with or after having successfully completed the General Chemistry I lecture. 3 hours Laboratory — 1 credit

CH 1203
General Chemistry II
General Chemistry II deals with chemical kinetics, the concept of ionic equilibria, buffer solutions, thermodynamics, electrochemistry, coordination compounds, and nuclear chemistry. Prerequisite: General Chemistry I and General Chemistry I Laboratory. This course is to be taken concurrently with the General Chemistry II Laboratory. 3 hours Lecture — 3 credits

CH 1203L
General Chemistry II Laboratory
The laboratory’s experimental sequence is designed to enhance and develop laboratory technique. A large part of General Chemistry II Laboratory is devoted to qualitative and quantitative analysis of cations and anions. Chemical equilibrium is also covered. This course is to be taken concurrently with or after having successfully completed the General Chemistry II lecture. 3 hours Laboratory — 1 credit

CH 2003
Principles of Organic Chemistry
This course surveys both aliphatic and aromatic classes of compounds with their traditional subclasses. Basic reaction mechanisms are introduced and special topics, such as fats and oils, detergents, carbohydrates, and proteins are covered briefly. Prerequisite: General Chemistry I and II Lecture and Laboratory. This course should be taken concurrently with the Principles of Organic Chemistry Laboratory. 3 hours Lecture — 3 credits.

CH 2003L
Principles of Organic Chemistry Laboratory
The laboratory introduces the common techniques used for the separation, purification and identification of organic compounds, including chromatographic techniques and infrared spectroscopy. This course is to be taken concurrently with or after having successfully completed the Principles of Organic Chemistry lecture. 3 hours Laboratory — 1 credit.

CH 2004
Fire Protection Chemistry
This course provides the student with the knowledge of the chemistry of materials and their physical properties as these subjects relate to fire. 1 hour Lecture and Discussion — 1 credit

CH 2005
Chemistry of Hazardous Materials
This course covers the unique requirements in handling hazardous materials when they are encountered in a chemical emergency. 1 hour Lecture and Discussion — 1 credit

CH 2006
Safety in the Laboratory
This course deals with the hazards associated with handling chemicals that have acute or chronic toxicities and/or physical hazards in the research laborato-
CH 2007
Introduction to Forensic Science
This lecture/laboratory course is designed to acquaint the student with the principles of forensic science, to introduce the student to the different areas of forensic science, and to introduce the student to some applications of biological, chemical and physical methods in the forensic sciences. Proper evidence handling is also discussed. Prerequisites: successful completion of at least one semester of college chemistry. 3 hours Lecture and 3 hours Laboratory — 4 credits

CH 2120
Organic Chemistry I
The first of a two-course sequence on Organic Chemistry, this course reviews the basic concepts of bonding and of acid-base theory as they apply to organic compounds. The structure, properties, nomenclature and chemistry of the alkanes, alkyl halides, alkenes, alkynes and the alcohols are covered in-depth. The development of reaction mechanisms is discussed and the mechanisms for substitutions, eliminations and additions are studies and applied to the reactions of alkyl halides, alkenes and the alcohols. Prerequisites: General Chemistry II Lecture and Laboratory. This course should be taken concurrently with the Organic Chemistry I Laboratory. 3 hours Lecture — 3 credits

CH 2120L
Organic Chemistry I Laboratory
The Organic Chemistry I laboratory introduces the common techniques used for the separation, purification and identification of organic compounds, including chromatographic techniques and infrared spectroscopy. The reaction of the functional groups covered in Organic Chemistry I are studied. Prerequisites: General Chemistry II Lecture and Laboratory. This course should be taken concurrently with Organic Chemistry I lecture. 3 hours Laboratory — 1 credit

CH 2131
Descriptive Environmental Chemistry
This course surveys inorganic chemistry with an environmental emphasis, geochemical cycles, aqueous equilibria, redox, bacterial processes, heavy metals, and atmospheric chemistry. Prerequisites: General Chemistry I and II Lecture and Laboratory. 1 hour Lecture and 2 hours Laboratory — 2 credits

CH 2200
Organic Chemistry II
The second of the two course sequence on Organic Chemistry, this course is an introduction to the structure, properties, nomenclature and chemistry of the aromatic compounds, ketones, aldehydes, the carboxylic acids and their derivatives and the amines. The mechanisms of aromatic substitution, of additions, reductions and oxidations of the carbonyl compounds and the synthesis and reactions of the amines are studied. The role of organic compounds in biological systems is introduced throughout the course. Prerequisites: Organic Chemistry II Lecture and Laboratory. This course should be taken concurrently with the Organic Chemistry II Laboratory. 3 hours — 3 credits

CH 2220L
Organic Chemistry II Laboratory
The Organic Chemistry Laboratory includes the study of the reactions and mechanisms covered in the Organic Chemistry II Lecture. An introduction to qualitative organic analysis and to Nuclear Magnetic Resonance spectroscopy is also included. Prerequisite: Organic Chemistry I Lecture and Laboratory; Prerequisite or concurrent: Organic Chemistry II lecture. 3 hours Laboratory — 1 credit

CH 2155-CH 2256
Selected Topics I and II
A discussion and laboratory course dealing with modern chemical concepts. The student, with concurrence from the instructor, will investigate in depth a topic of his/her choice. Example topics include inorganic syntheses, glassblowing, radiochemistry, and symmetry. Elective for Chemistry sophomores, juniors or seniors with permission of Department Chairperson. 3 hours Laboratory and Instruction each — 1 credit each

CH 2201
Chemical Literature
This course includes a discussion of the content and the usage of the various sources of chemical information. Emphasis is placed both on locating specific facts and on on-line literature searches. Regular library assignments are given. Prerequisite: At least sophomore standing. 1 hour Lecture — 1 credit

CH 2203
Biochemistry
A systematic survey of the major biological molecules, including proteins, carbohydrates, lipids, and
nucleic acids. This course introduces students to the general principles of biochemistry and illustrates the interplay of molecular structure and function. Topics covered may include protein architecture, enzyme kinetics and mechanisms, membrane and transportation, molecular genetics, and the central metabolic pathways. Prerequisite: Principles of Organic Chemistry Lecture and Laboratory or Organic Chemistry I Lecture and Laboratory. 3 hours Lecture — 3 credits

**CH 2203L Biochemistry Laboratory**
The laboratory introduces common techniques used for the separation, purification, identification and analysis of biochemical compounds. Various types of chromatography, electrophoresis and spectroscopy are studied. Prerequisite: Organic Chemistry I Lecture and Laboratory or Principles of Organic Chemistry Lecture and Laboratory. This course is to be taken concurrently with or having successfully completed Biochemistry lecture. 3 hours Laboratory — 1 credit

**CH 2370 Employment Program**
Each student in Chemistry is required to spend 500 hours in approved jobs related to the major. Each employment experience that will be used toward the Employment Program must be registered with the Office of Career and Life Education before employment commences — 4 credits

**CH 3001 Introductory Biomedical Instrumental Methods**
A survey, in both theory and practice, of the various types of instrumentation used in the biomedical and pharmaceutical research fields. Laboratory work includes gaining experience with various types of spectroscopic, chromatographic, colorimetric, radiochemical and radiographic equipment. Prerequisites: General Chemistry I and II Lecture and Laboratory. Organic Chemistry and Biochemistry with Laboratory are also desirable. 2 hours Lecture and 3 hours Laboratory — 3 credits

**CH 3122 Radioisotope Techniques**
Introductory lecture course dealing with the properties of radiation, elementary radioisotope calculations, and chemical, medical and biological uses of radioisotopes. Prerequisite: Permission of Instructor. 3 hours Lecture and Discussion — 3 credits

**CH 3125 Physical Chemistry I**
This course covers the general areas of equations of state for real gases, the laws of thermodynamics and their applications, thermochemistry, homogeneous equilibria, phase equilibria, and electrochemistry. Prerequisites: Calculus II and Physics II or Permission of Instructor. This course is to be taken concurrently with the Physical Chemistry I Laboratory. 3 hours Lecture — 3 credits

**CH 3125L Physical Chemistry I Laboratory**
The laboratory reinforces the topics covered in Physical Chemistry I. Various types of calorimetry are studied as well as experiments with vapor pressure, gas viscosity, heat capacity and phase equilibria. This course is to be taken concurrently with or after having successfully completed Physical Chemistry I lecture. 3 hours Laboratory — 1 credit

**CH 3130 Analytical Chemistry**
This course includes gravimetric and volumetric methods of analysis as well as an introduction to colorimetric, electro-analytical, and chromatographic techniques. Prerequisites: General Chemistry I and II. 3 hours Lecture and 4 hours Laboratory — 4 credits

**CH 3157 Advanced Inorganic Laboratory**
Inorganic and organometallic compounds are prepared using a variety of synthetic techniques and apparatus not encountered in the lower division laboratory courses. Students may select syntheses from the course collection or may suggest new ones from other sources such as the current literature. Prerequisites: Organic Chemistry I and II Lecture and Laboratory. 3 hours Laboratory — 2 credits

**CH 3220 Advanced Organic Chemistry**
Organic reaction mechanisms and their modification by inductive, resonance, and steric effects are covered in depth. Also discussed are methods of determining reaction mechanism, stereochemistry, orbital symmetry relationships, and selected topics in synthesis. Prerequisites: Organic Chemistry II Lecture and Laboratory and Physical Chemistry II lecture and laboratory. 3 hours Lecture — 3 credits
CH 3223
Instrumental Analysis
A survey of the sources of chemical signals, and their
detection and amplification by instrumental methods.
Laboratory work includes visible-ultraviolet and
infrared spectroscopy, gas chromatography, polarog-
raphy, potentiometry, coulometry, and liquid chro-
matography. Prerequisites: Analytical Chemistry, and
Physical Chemistry I or Permission of Instructor.
3 hours Lecture and 4 hours Lab — 4 credits

CH 3224
Physical Chemistry II
This course covers kinetics, elementary quantum
mechanics and its application to bonding theories.
Basic theory of spectroscopy and diffraction and use
in molecular structure determination including
Fourier transforms, adsorption and heterogeneous
catalysis, as well as transport mechanisms and dipole
moments are also covered. Prerequisites: Physical
Chemistry I Lecture and Laboratory and Ordinary
Differential Equations or Permission of Instructor.
3 hours Lecture — 3 credits

CH 3224L
Physical Chemistry II Laboratory
This course concentrates on experiments reinforcing
topics covered in Physical Chemistry II. Typical
experiments will include particle in a box, ionic
strength measurements, X-ray diffraction and the the-
ory and application of molecular spectroscopy. This
course is to be taken concurrently with or after hav-
ing successfully completed Physical Chemistry II
Lecture. Prerequisites: Physical Chemistry I lecture
and Laboratory. 3 hours Laboratory — 1 credit

CH 4025
Polymer Chemistry Introduction
This course provides a fundamental understanding of
terms and procedures employed in the polymer sec-
tion of industry. Topics to be covered include poly-
mer structure, synthesis and behavior; processing;
environmental effects; and special materials, such as
composites and biopolymers. Prerequisites: Organic
Chemistry I and II. 3 hours Lecture — 3 credits

CH 4041
Senior Research
Selected seniors engage in supervised investigations
involving library work and laboratory experiments
related to chemistry. Requirement: Permission of
Department Chairperson — 1-3 credits

CH 4117
Organic Analysis
This course teaches the identification of organic com-
ounds through the use of physical properties, chemi-
cal tests, spectroscopic analysis, and preparation of
known derivatives. Emphasis is placed on the modifi-
cation of physical and chemical properties by steric
and electronic effects. Infrared and ultraviolet spectrometers
and a gas chromatograph are available for laboratory
use. Computer simulations of compound identifications
are an integral part of the program. Prerequisites:
Instrumental Analysis and Organic Chemistry II Lecture
and Laboratory or Permission of Instructor. 3 hours
Lecture and 3 hours Laboratory — 4 credits

CH 4126
Advanced Inorganic Chemistry
Present theories of chemical bonding are treated.
These include electrostatic, valence bond, molecular
orbital, and continuous solid models. From these the
structures of inorganic substances are derived. Topics
such as symmetry and Point Groups, nonaqueous sol-
vent systems, secondary chemical forces, and structure
and properties of transition metal complexes are treat-
ed. When time permits, a survey of organometallic
chemistry is included. Prerequisite: Physical Chemistry
II Lecture and Laboratory. 3 hours Lecture — 3 credits

CH 4150
Separation Methods
The course will focus on the development of methods
for laboratory scale separations which are driven by
distribution equilibria or by external fields. The funda-
mental principles that govern separation at the molec-
ular level will be discussed. The theory of
chromatographic retention will be covered, followed
by the study of the instrumentation required for gas,
liquid and supercritical fluid chromatography and elec-
trophoretic techniques. The application of theory and
instrumentation to the development of methods will
be stressed. Prerequisites: Biomedical Instrumentation
or Instrumental Analysis. 1 hour lecture and 2 hours
laboratory — 2 credits

CH 4201
Seminar (Chemistry)
Student-led, in-depth discussions on specific chemical
questions. 1 hour Lecture and Discussion — 1 credit

CH 4205
Advanced Biochemistry
A presentation of modern biochemical topics, includ-
ing the chemistry of cellular compounds, energy
transformation in living organisms, and the synthesis and properties of macromolecules. Prerequisites: Biochemistry Lecture and Lab. 3 hours Lecture and 3 hours Lab — 4 credits

CH 4241
Advanced Physical Chemistry
This course will cover one of several sub-disciplines of physical chemistry as selected by the instructor. Areas of study may include, but are not restricted to: biophysical, green or physical organic chemistry, materials and material characterization, nanotechnology, optical and electronic devices, polymers, statistical mechanics. Prerequisite: Physical Chemistry II or Permission of Instructor. 3 hours Lecture — 3 credits

COMPUTER AND BUSINESS INFORMATION SYSTEMS

IT 1011
Information Technology Concepts
This course introduces many fundamental concepts of computers and information technology. Lectures and discussions include computer hardware and software, Internet and World Wide Web, data file and database, telecommunications and networks, and future technology trends. 1.5 hours Lecture and Discussion — 1.5 credits. Prerequisites: None. It is strongly recommended that it be taken with Computer Applications.

IT 1012
Computer Applications
This course introduces the basics of popular and useful computer applications. Emphasis is placed on a working knowledge of windows operating system, word processing, spreadsheet, and presentation software at the introductory level. MS Windows and Office software are used for hands-on exercises. 1.5 hours Lecture and Hands-on — 1.5 credits. Prerequisites: None. It is strongly recommended that it be taken with Information Technology Concepts.

IT 1031
Intermediate Computer Applications
This course extends computer applications into real world projects. Emphasis is placed on a working knowledge of word processing, spreadsheet, and database management software at the intermediate level. MS Office software is used for hands-on exercises. Prerequisites: Information Technology Concepts and Computer Applications for non-CBIS students; successful performance on CBIS departmental diagnostic exam for CBIS students. 3 hours Lecture and Hands-on — 3 credits.

IT 2118
Web Design
This course introduces the generally accepted web design principles that underlie the construction of Web pages and applets. Students will create a variety of web pages using HTML, JavaScript, and web design application software. Students will also learn the fundamentals of XML data and integration. Prerequisites: Information Technology Concepts and Computer Applications for non-CBIS students; Intermediate Computer Applications for CBIS students. 3 hours Lecture and Hands-on — 3 credits.

IT 2216
Introductory Programming
This course teaches the programming logic and the process of writing a computer program using C/C++ programming language. Students will obtain an understanding of sequence, selection, and repetition statements, files, arrays, functions, and subprograms. Prerequisites: Information Technology Concepts and Computer Applications for non-CBIS students; Intermediate Computer Applications for CBIS students. 3 hours Lecture and Hands-on — 3 credits.

IT 2218
Advanced Programming
This course is a continuation of the Web Design and Introductory Programming courses. Object-oriented program design with emphasis on the Java programming language will be taught. Additional topics include GUI controls, exceptions, threads, and applets. Prerequisites: Introductory Programming and Web Design. 3 hours Lecture and Hands-on — 3 credits.

IT 2370
Employment Program
Each student in Computer and Business Information Systems is required to spend 500 hours in approved jobs related to the major. Each employment experience that will be used toward the Employment Program must be registered with the Office of Career and Life Education before employment commences — 4 credits.

IT 3000, 4000
Selected Topics in IT
These courses are designed to permit the timely introduction of new topics in areas of information