BIO 496. Research Literature (0, 4). 1 credit.
Students pursue literature research in a selected area of biology. Students must contact and make arrangements with a supervising instructor in the term prior to registration. May be repeated for a maximum of 2 credits when course content changes. Prerequisite: GPA of 2.5 or greater.

BIO 497. Biological Research (0, 4-8). 1-2 credits.
Students pursue a lab or field research project in a selected area of biology. Students must contact and make arrangements with a supervising instructor in the term prior to registration and complete a 2-3 page proposal no later than five weeks after the start of the course. Course may be repeated. Prerequisite: GPA of 2.5 or greater.

BIO 499. Senior Project (0, 8). 2 credits.
Three semester courses taken as Parts A, B and C, 2 credits each. Expectations, requirements and prerequisites are defined in the department senior project policy. Students must contact and make arrangements with a supervising instructor in the term prior to registration.

Biotechnology
College of Science and Mathematics and College of Integrated Science and Technology
BIOT 260. Biotechnology Seminar. 1 credit.
An introduction to biotechnology. Topics will include research opportunities, careers and current topics in biotechnology. Not available for biology major or minor credit.

Business Analytics
College of Business
BSAN 391. Quantitative Business Modeling. 3 credits.
This course addresses a wide range of complex business problems through quantitative modeling and appropriate computer applications, especially spreadsheets. Approaches include optimization and sensitivity analysis, multi-objective decision making and risk analysis. Prerequisites: COB 291 or equivalent with a grade of "B-" or higher and junior or senior standing.

BSAN/CIS 392. Descriptive and Predictive Analytic Methods. 3 credits.
This course integrates advanced analytical methods from statistics and management science for enhanced understanding of business performance and improved predictive capabilities. The emphasis is on applying computer applications for statistical modeling and analysis of data from a variety of business processes to support managerial decision-making. Prerequisites: COB 291 or equivalent with a grade of "B-" or higher and junior or senior standing.

BSAN/CIS 393. Predictive Analytics and Data Mining. 3 credits.
This course focuses on quantitative techniques and computer applications that allow the extraction of useful, previously unrecognized information from large data sets for predictive purposes. By effectively sifting through databases such as those generated by many businesses, data mining allows the analyst to recognize potentially important patterns and to target business opportunities. Prerequisites: COB 291 or equivalent with a grade of "B-" or higher and junior or senior standing.

BSAN/CIS 490. Special Studies in Computer Information Systems or Business Analytics. 1-3 credits.
An advanced course in information and/or business analytics designed to give qualified students an opportunity to complete independent study under faculty supervision. Prerequisites: Senior standing, recommendation of the instructor and written approval of the department head prior to registration.

BSAN 498. Special Topics in Business Analytics. 3 credits.
An advanced course designed to allow exploration of current topics in business analytics. Course content will vary. See adviser for current content. Prerequisite: Permission of the instructor.

Business Law
College of Business
BLAW 314. Real Estate Law. 3 credits.
A study of the principles of law governing interests in real estate including acquisition, encumbrance, transfer, rights and obligations of parties, and state and federal regulations thereof. Prerequisites: COB 218 and junior standing.

BLAW 470. Financial Products: Regulation and Protection. 3 credits.
An inquiry into the legal environment of the financial marketplace. Topics explored include the role of regulatory agencies, the design of contracts which minimize credit risk and maximize marketability, and methods of protecting the proprietary component of innovative financial products. Prerequisites: COB 218 and junior standing.

BLAW 494. White Collar Crime. 3 credits.
A study of white collar crime in America, a unique type of criminal activity that primarily affects businesses. The course explores the substance of white collar crime and focuses on the unique elements of various crimes through the study of actual cases. The course also examines how white collar crimes are prosecuted and defended in state and federal courts. Students are introduced to federal and state criminal procedure, substantive defenses, and the use of sentencing guidelines. Prerequisite: COB 300.

BLAW 495. Contract Law, Sales and Secured Transactions. 3 credits.
A study of the law of contracts, Article Two of the Uniform Commercial Code, product liability, legal liability of accountants, secured transactions and bankruptcy with emphasis on the role these play in professional and personal decision making. The courts, the legislature and the interaction of these two branches of government in responding to a changing society are studied thoroughly. Prerequisites: COB 218 and COB 300.

BLAW 496. The Law of Business Organizations, Negotiable Property Instruments and Property. 3 credits.
A study of Article Three of the Uniform Commercial Code, agency, partnerships, corporations, securities regulations, real property, trusts and decedents estates with emphasis on the role these play in professional and personal decision making. Prerequisites: COB 218 and COB 300 or permission of instructor.

BLAW 497. Legal Aspects of International Business. 3 credits.
Survey of legal implications of international business dealings including foreign direct sales, distributorship arrangements, licensing of technology and legal aspects of the multi-national corporation. The foreign legal environment, relevant conventions and trade regulations, and the transnational reach of regulatory law will be considered. Prerequisites: COB 218 and senior standing.

BLAW 498. Special Topics in Business Law. 3 credits.
This course is designed to allow exploration of areas of current topics in business law. Course content will vary by semester and instructor. For current content, consult the adviser. Prerequisites: COB 300 and permission of the instructor.

Business and Marketing Education
College of Education
BMED 200. Introduction to Business and Marketing Education. 3 credits.
A general survey of business and marketing principles as they relate to preparation for teaching with emphasis on the history of business and marketing in America, the basic forms of business organizations, ownership, finance, management, taxes and wages, and labor relations.

BMED 230. Document Design and Production. 3 credits.
Experience in planning, designing and producing documents for the business office with focus on transferability of productivity among the genre of word processing software. Prerequisite: Keyboard in excess of 40 words per minute with at least 95 percent word accuracy without visual reference to the keyboard.

BMED 380. Data and Records Management. 3 credits.
Develops skills in managing the information of business by organizing data through the creation and use of computer spreadsheets and databases. Includes the management and organization of hard records.

BMED 376. Occupational Experience in Business. 3 credits.
Supervised internship providing business office experience for students seeking licensure as business education teachers in middle and secondary schools. A credit/no credit grade will be assigned. Prerequisite: Permission of the instructor.

BMED 377. Occupational Experience in Marketing. 3 credits.
Supervised internship providing marketing (retail, promotion, entertainment, merchandising, etc.) experience for students seeking licensure as marketing education teachers in middle and secondary schools. A credit/no credit grade will be assigned. Prerequisite: Permission of the instructor.

BMED 380. Demonstration Methods for Business and Marketing. 3 credits.
Development of an instructional model incorporating demonstrations and supervised walk-throughs in planning and directing the learning of computer-related and other complex business and marketing procedures and processes.

http://www.jmu.edu/catalog/13
CHEM 100. Concepts of Chemistry. 3 credits.
A one-semester introduction to the fundamental principles, laws and applications of chemistry. Examples relating to health sciences are emphasized. Not available for major or minor credit in chemistry.

CHEM 120. Concepts of Chemistry II. 3 credits.
A course designed to examine the mechanisms by which chemists obtain information about reacting systems. Major concepts covered include: chemical reactivity, chemical equilibrium, electrochemistry, thermodynamics and kinetics. Prerequisites: Grades of "C" or higher in CHEM 131 or either CHEM 131L or CHEM 135L. Corequisite: CHEM 132L or 13B.

CHEM 131. General Chemistry I. 3 credits.
The first of a two-course general chemistry sequence for science majors. It is designed to introduce students to basic chemical concepts including atomic structure, periodic properties of the elements, nomenclature, basic stoichiometry, theories related to reactivity and bonding, and the behavior of materials. Corequisite: CHEM 131L or CHEM 135L.

CHEM 132. General Chemistry II. 3 credits.
A course designed to examine the mechanisms by which chemists obtain information about reacting systems. Major concepts covered include: chemical reactivity, chemical equilibrium, electrochemistry, thermodynamics and kinetics. Prerequisites: Grades of "C" or higher in CHEM 131 and either CHEM 131L or CHEM 135L. Corequisite: CHEM 132 or 13B.

CHEM 131L*-132L. General Chemistry Laboratories. 1 credit each semester.
These laboratory courses are designed to complement and supplement the CHEM 131-132 lecture courses. Chemistry majors take CHEM 135L and 136L. Prerequisites for CHEM 132L: Grades of "C" or higher in CHEM 131 or either CHEM 131L or CHEM 135L.

CHEM 135L. Special General Chemistry Laboratory. 1 credit.
An enriched laboratory course designed primarily for chemistry majors. Corequisite: CHEM 131.

CHEM 136L. Special General Chemistry Laboratory. 2 credits.
An enriched laboratory course that includes special topics and experiments not presented in the regular CHEM 132 laboratory. Prerequisites: Grades of "C" or higher in CHEM 131 and either CHEM 131L or 135L. Corequisite or prerequisite: CHEM 132.

The major objective for this course is to teach the modern method of scientific problem solving using organic compounds as models. Emphasis will be on the chemical language (nomenclature and terminology), molecular electronic concepts, theories of organic reactions, stereochemistry and structure elucidation of organic compounds. Prerequisite: Grade of "C" or higher in CHEM 132.

CHEM 241L. Concepts of Organic Chemistry Laboratory. 1 credit.
Laboratory work will include training in the techniques of organic chemistry, preparation of compounds and some organic qualitative analysis. Prerequisite or corequisite: CHEM 241.

The major objective for this course is to teach the modern method of scientific problem solving using organic compounds as models. Emphasis will be on the chemical language (nomenclature and terminology), molecular electronic concepts, theories of organic reactions, stereochemistry and structure elucidation of organic compounds. Prerequisite: Completion of CHEM 241 with a grade of "C" or higher.

CHEM 242L. Organic Chemistry Laboratory. 2 credits.
This course will present laboratory techniques and experiments associated with organic chemistry, including an introduction to synthesis, spectroscopic methods, chromatographic techniques and some qualitative organic analysis. Corequisite: CHEM 242. Prerequisites: A grade of "C" or higher in CHEM 241.

CHEM 260. Concepts of Biochemistry. 3 credits.
A brief survey of the principal constituents of living cells, proteins, carbohydrates, lipids and nucleic acids, with emphasis on their synthesis and transformations in vivo. Intermediary metabolism and protein replication will be stressed. Not available for major or minor credit. Prerequisite: CHEM 241 and CHEM 241L.

CHEM 260L. Concepts of Biochemistry Laboratory. 1 credit.
The laboratory work will comprise experiments demonstrating some of the pertinent reactions including those of analytical value. Prerequisite or corequisite: CHEM 260.

CHEM 270. Inorganic Chemistry I. 3 credits.
A survey of the chemistry of the elements and modern theories of bonding. Prerequisite: A grade of "C" or higher in CHEM 132.

CHEM 280. An Alternative Lower-Division Chemistry Experience. 1-4 credits.
This course will provide a mechanism for offering a nontraditional, lower-division, lecture and/or laboratory course. It will be offered only with the approval of the full-time teaching faculty. No course will be offered more than three times under the 280 designation. Students may repeat CHEM 280 for credit when course content changes.

CHEM 287L. Integrated Inorganic/Organic Laboratory. 2 credits.
An enriched, integrated introduction to the laboratory procedures associated with inorganic and organic chemistry. Topics include apparatus design and construction, synthesis, separation methods, spectroscopic analysis and application of computers in the laboratory. Prerequisite or corequisite: CHEM 241.

CHEM 288L. Integrated Inorganic/Organic Laboratory. 2 credits.
An enriched, integrated introduction to the laboratory procedures associated with inorganic and organic chemistry. Topics include apparatus design and construction, synthesis, separation methods, spectroscopic analysis and application of computers in the laboratory. Prerequisite: A grade of "C" or better in CHEM 241. Prerequisite or corequisite: CHEM 270.

CHEM 325. Chemical Hazards and Laboratory Safety. 1 credit.
A brief introduction to physical and chemical hazards which may be encountered in a laboratory setting. Methods of personal protection will be emphasized.

CHEM 331. Physical Chemistry I. 3 credits.
A study of thermodynamics, solutions, kinetics and macromolecules with applications of chemical and biological problems. Prerequisites: CHEM 132, MATH 236 and PHYS 240.

CHEM 338L. Applied Physical Chemistry Laboratory. 2 credits.
A laboratory course which emphasizes the applied experimental aspects of physical chemistry. Prerequisite or corequisite: CHEM 331.

CHEM 351. Analytical Chemistry. 4 credits.
The total analysis concept is introduced and developed. This framework encompasses the areas of experiment design, sample collection and treatment, and statistical evaluation of results, as well as standard analysis techniques. Prerequisite: CHEM 132.

CHEM 352. Instrumental Analysis. 3 credits.
This course emphasizes the application of instrumental techniques to the quantitative determination of chemical composition. Both instrument theory and practical applications are presented. Prerequisites: CHEM 351 and MATH 235.

CHEM 352L. Instrumental Analysis Laboratory. 2 credits.
This course will introduce students to the methodology and technology associated with the design and use of chemical instrumentation. Students perform experiments that illustrate the theoretical principles associated with instrument designs and the application of instruments to the solution of qualitative and quantitative analysis problems. Corequisite: CHEM 352.