CHEMISTRY (CHM)

CHM 1020 - Chemistry in Society (3 Credits)
This course provides students with an introduction to chemical principles and applications for the non-science major. Students will engage in problem solving and critical thinking while applying chemical concepts. Topics will include the scientific method of problem solving, classification of matter, atomic theory, the periodic table, gases, chemical reactions, energy, and chemical bonds.
Attribute(s): GENA - Gen. Ed -Natural Sci., Gen. Ed -Natural Sci., SCIQ - Scientific Inquiry, Scientific Inquiry

CHM 1025 - Introductory General Chemistry (3 Credits)
This is a one semester introduction to General Chemistry designed to prepare students planning to enter CHM 1045/1046 sequence. Concepts covered include matter and measurement, atomic structure, bonding, gases, chemical reactions and solutions.
Prerequisite(s): MAC 1105 (may be taken concurrently) or MAC 1147 (may be taken concurrently) or MAC 2157 (may be taken concurrently) or MAC 2311 (may be taken concurrently)
Attribute(s): GENA - Gen. Ed -Natural Sci., Gen. Ed -Natural Sci., SCIQ - Scientific Inquiry, Scientific Inquiry

CHM 1032 - General, Organic& Biochemistry (3 Credits)
This course provides a survey of the principles of inorganic and general chemistry, organic chemistry and biochemistry and their applications to human anatomical and physiological functions.
Prerequisite(s): MAC 1105 or MAC 1147 or MAC 2311
Corequisite(s): CHM 1032L
Attribute(s): GENA - Gen. Ed -Natural Sci., Gen. Ed -Natural Sci., SCIQ - Scientific Inquiry, Scientific Inquiry

CHM 1032L - Gen, Organic, Biochemistry Lab (1 Credits)
The purpose of this course is to provide the student with laboratory exercises in chemistry for non-science majors. Students will use laboratory equipment to perform experiments to explore chemical concepts of general, organic chemistry and biochemistry and relate these applications to human anatomical and physiological functions.
Prerequisite(s): MAC 1105 or MAC 1147 or MAC 2311
Corequisite(s): CHM 1032
Attribute(s): GENL - Gen. Ed -Science Lab, Gen. Ed -Science Lab, SCIQ - Scientific Inquiry, Scientific Inquiry

CHM 1045 - General Chemistry I (3 Credits)
This course is designed for students pursuing careers in the sciences or who need a more rigorous presentation of chemical concepts than is offered in an introductory course. Students will engage in problem solving and critical thinking while applying chemical concepts. Topics will include the principles of chemistry including atomic theory, electronic and molecular structure, measurement, stoichiometry, bonding, periodicity, thermochemistry, nomenclature, solutions, and the properties of gases.
Prerequisite(s): MAC 1105 or MAC 1147 or MAC 2311 or MAC 2157 or Accuplacer Coll. Math Subscore with a score of 066 or SAT Math Score with a score of 600 or MATH SECTION SCORE with a score of 620 or ACT Math with a score of 26
Corequisite(s): CHM 1045L
Attribute(s): GENA - Gen. Ed -Natural Sci., Gen. Ed -Natural Sci., SCIQ - Scientific Inquiry, Scientific Inquiry

CHM 1045L - General Chemistry I Laboratory (1 Credits)
Intended for science majors. Laboratory course to accompany CHM 1045 and provides a deeper and more concrete understanding of selected topics discussed in CHM 1045. This course will concentrate on developing fundamental laboratory skills and techniques, including titration, calorimetry, gravimetric analysis, spectroscopy, quantitative data analysis, evaluation of errors and accuracy in the laboratory, and safe lab practices.
Prerequisite(s): MAC 1105 or MAC 1147 or MAC 2311 or Accuplacer Coll. Math Subscore with a score of 066 or SAT Math Score with a score of 600 or MATH SECTION SCORE with a score of 620 or ACT Math with a score of 26
Corequisite(s): CHM 1045
Attribute(s): GENL - Gen. Ed -Science Lab, Gen. Ed -Science Lab, SCIQ - Scientific Inquiry, Scientific Inquiry

CHM 1046 - General Chemistry II (3 Credits)
Intended for science majors. Examines solutions redox reactions, kinetics and equilibria, thermodynamics, electrochemistry, nuclear chemistry and descriptive chemistry.
Prerequisite(s): (CHM 1045C or (CHM 1045 and CHM 1045L))
Corequisite(s): CHM 1046L
Attribute(s): GENA - Gen. Ed -Natural Sci., Gen. Ed -Natural Sci., SCIQ - Scientific Inquiry, Scientific Inquiry

CHM 1046L - General Chemistry II Lab (1 Credits)
Intended for science majors. Laboratory experiments related to principles discussed in the lecture class of general chemistry II. Experiments include measurement of reaction kinetics, determination of activation energy, measurement of equilibrium constants, titration of a polyprotic acid, Ksp measurements, enthalpy measurements, and electrochemistry experiments.
Prerequisite(s): (CHM 1045C or (CHM 1045 and CHM 1045L))
Corequisite(s): CHM 1046
Attribute(s): GENL - Gen. Ed -Science Lab, Gen. Ed -Science Lab, SCIQ - Scientific Inquiry, Scientific Inquiry

CHM 1084C - Environmental Chemistry (4 Credits)
INTENDED FOR SCIENCE MAJORS. ~ The study of the basic concepts of organic and inorganic chemistry in the context of applications to the environmental issues of water quality, atmospheric pollution, sustainable agricultural practices, and environmental risks to human health. THE CURRICULUM IS INQUIRY BASED AND FULLY INTEGRATED WITH A LABORATORY THAT EMPHASIZES ACTIVE LEARNING STRATEGIES.
Prerequisite(s): (CHM 1045C or (CHM 1045 and CHM 1045L))
Attribute(s): GENC - Gen. Ed -Natural Sci+Lab, Gen. Ed -Natural Sci+Lab, SCIQ - Scientific Inquiry, SUSC - Sustainability Component, Scientific Inquiry

CHM 2210 - Organic Chemistry I (3 Credits)
Emphasizes chemical reactivity in synthetic and biochemical processes. Functional group chemistry is learned by stressing the relationship between structure and reactivity Reactions are categorized by mechanisms rather than by functional group. Includes spectroscopy, synthesis, nomenclature and mechanisms.
Prerequisite(s): (CHM 1046L and CHM 1046) or CHM 1046C
Corequisite(s): CHM 2210L

CHM 2210L - Organic Chemistry I Laboratory (1 Credits)
Companion laboratory to Organic Chemistry I. The experiments develop expertise using organic chemistry techniques and familiarity with equipment and glassware commonly used in organic chemistry. Some of the experiments are illustrate concepts discussed in the lecture class, such as substitution and elimination reactions.
Prerequisite(s): (CHM 1046C or (CHM 1046 and CHM 1046L))
Corequisite(s): CHM 2210

CHM 2211 - Organic Chemistry II (3 Credits)
Continues the study of organic compounds described for organic chemistry I. Reactions, mechanisms, nomenclature and spectroscopy are discussed for benzene, substituted benzene compounds and carbonyls. Oxidation-reduction reactions are studied in greater detail. The chemistry of biologically important compounds, amino acids, and nucleic acids is discussed. Polymers and biopolymers are introduced.
Prerequisite(s): (CHM 2210 and CHM 2210L) or CHM 2210C
Corequisite(s): CHM 2211L

CHM 2211L - Organic Chemistry II Laborator (1 Credits)
Companion laboratory to Organic Chemistry II. The experiments continue to develop expertise with organic chemistry techniques and familiarity with equipment and glassware commonly used in organic chemistry. Some of the experiments are illustrate concepts discussed in the lecture class such as aromatic substitution reactions with carbonyl compounds.
Prerequisite(s): (CHM 2210C or (CHM 2210 and CHM 2210L))
Corequisite(s): CHM 2211

CHM 2282C - Chemistry of Medicinal Plants (3 Credits)
This class focuses on the major medicinal products that have originated from plant materials. The class will focus on organic compounds, how they are isolated from plants and metabolism of these products. The course will take students from general chemistry fundamentals to understanding role of plants and their products in biological environments.

CHM 2414C - The Science of Cooking (3 Credits)
The course concentrates on the study of the major classes of organic compounds-carbohydrates, fats and oils, and proteins-with emphases on their reactivity and utility in cooking. Foods used in cooking will be deconstructed into their basic components allowing one to scientifically approach the design of an experiment, i.e., the fashioning of a correct and useful recipe.

CHM 3120 - Analytical Chemistry (3 Credits)
Principles of quantitative analysis. Topics include equilibria, titrations, precipitation, complex formation, gravimetric analysis, separation processes, photometry, statistical treatment of data and sampling methodology.
Prerequisite(s): CHM 1046C or (CHM 1046 and CHM 1046L)
Corequisite(s): CHM 3120L

CHM 3120L - Analytical Chemistry Lab (1 Credits)
This course is the laboratory portion of Analytical Chemistry (CHM 3120). Students will gain experience with titrations, spectrophotometry, and other analytical chemistry techniques, as well as data analysis and statistics in chemistry.
Prerequisite(s): CHM 1046C or (CHM 1046 and CHM 1046L)
Corequisite(s): CHM 3120

CHM 3410 - Physical Chemistry I (3 Credits)
The first part of a two-semester calculus-based course in physical chemistry. Topics covered include states of matter, thermodynamics, solutions, and kinetics.
Prerequisite(s): (CHM 2211C or (CHM 2211 and CHM 2211L)) and (CHM 3120C or (CHM 3120 and CHM 3120L)) and ((PHY 2049C or (PHY 2049 and PHY 2049L) or (PHY 2054C) or (PHY 2054 and PHY 2054L))) and MAC 2311
Corequisite(s): CHM 3410L

CHM 3410L - Physical Chemistry I Lab (1 Credits)
Introduction to laboratory techniques used to measure properties of matter and behavior of chemical and physical processes and may include the following topics: Behavior of solutions, properties of gases, kinetics, spectroscopy, and surface chemistry.
Prerequisite(s): (CHM 2211C or (CHM 2211 and CHM 2211L)) and (CHM 3120C or (CHM 3120 and CHM 3120L)) and ((PHY 2049C or (PHY 2049 and PHY 2049L) or (PHY 2054C) or (PHY 2054 and PHY 2054L))) and MAC 2311
Corequisite(s): CHM 3410

CHM 3411 - Physical Chemistry II (3 Credits)
THE SECOND PART OF A TWO-SEMESTER CALCULUS-BASED COURSE IN PHYSICAL CHEMISTRY. TOPICS INCLUDE DERIVATION OF THE LAWAS FOR QUANTUM MECHANICS, SPECTROSCOPY. RADIATION LAWS AND THE HYDROGEN ATOM.
Prerequisite(s): CHM 3410
Corequisite(s): CHM 3411L

CHM 3411L - Physical Chemistry II Lab (1 Credits)
This course will focus primarily on experiments that will provide insight into quantum mechanics. We will spend time on data collection, data manipulation and scientific writing. We will also familiarize ourselves with software used for theoretical quantum calculations.
Prerequisite(s): CHM 3410 (may be taken concurrently) and CHM 3410L (may be taken concurrently) and MAC 2313 (may be taken concurrently)
Corequisite(s): CHM 3411

CHM 3610 - Inorganic Chemistry (3 Credits)
Inorganic chemistry is an introduction to molecular orbital theory, crystal and ligand field theory, atomic orbitals, molecular symmetry, crystalline solid state chemistry, transition metal complexes, coordination chemistry, synthesis of inorganic compounds, organometallics, nanoscale materials, supramolecular aggregates, x-ray diffraction techniques, and bioinorganic chemistry.
Prerequisite(s): CHM 1046C or (CHM 1046 and CHM 1046L)
Corequisite(s): CHM 3610L

CHM 3610L - Inorganic Chemistry Laboratory (1 Credits)
Inorganic chemistry laboratory provides an introduction to modern techniques used for the synthesis and characterization of inorganic compounds. ~ Replaces CHM 4610L, effective 201508.
Prerequisite(s): CHM 1046C or (CHM 1046 and CHM 1046L)
Corequisite(s): CHM 3610

CHM 3940 - Internship in Chemistry (0-4 Credits)
An internship provides the student with an opportunity to work on a project in a laboratory or classroom setting. If this work is completed off-campus the student must work with a qualified supervisor at the site as well as a faculty mentor. Goals and objectives will be planned by the student, faculty mentor, and the off-campus supervisor when applicable. Permission of the Department Chair is required and is contingent on the student finding a faculty mentor.
Prerequisite(s): CHM 1046C or (CHM 1046 and CHM 1046L)
Attribute(s): WBLI - Work based learning indicator

CHM 4080C - Adv Environmental Chemistry (3 Credits)
Intended for Science Majors. This course introduces students to the fundamental chemistry relevant to environmental pollution and the environmental issues. Topics include stratospheric chemistry, ozone depletion, air pollution; toxic chemicals (metals and organics), water chemistry and water pollution, soil, sediments and wastes, green chemistry, environmental methods, quality assurance and quality control in environmental analysis. Laboratory is integrated with lecture topics and water quality, toxic metal levels in Fort Myers will be measured.
Prerequisite(s): CHM 2210C or (CHM 2210 and CHM 2210L)

CHM 4130 - Instrumental Analysis (3 Credits)
Principles of quantitative and qualitative analysis. Topics include spectroscopy, mass spectrometry, chromatography (gas chromatography and liquid chromatography), and electrochemistry. The spectroscopy covers visible and ultraviolet spectroscopy (UV-vis), Infrared (IR), nuclear magnetic resonance (NMR), atomic absorption spectroscopy (AAS) and atomic emission spectroscopy (AES), fluorescence and phosphorescence.
Prerequisite(s): (CHM 2211C or (CHM 2211 and CHM 2211L)) and (CHM 3120C or (CHM 3120 and CHM 3120L))
Corequisite(s): CHM 4130L

CHM 4130L - Instrumental Analysis Lab (1 Credits)
This course is the laboratory portion of Instrumental Analysis (CHM 4130). Students will gain hands-on experience using UV-Vis, IR, GC, etc., and other analytical chemistry techniques such as ion selective electrode (ISE) as well as data analysis and statistics in chemistry.
Prerequisite(s): (CHM 2211C or (CHM 2211 and CHM 2211L)) and (CHM 3120C or (CHM 3120 and CHM 3120L))
Corequisite(s): CHM 4130

CHM 4174C - Lasers in Physical Sciences (3 Credits)
This course is an upper level, predominantly laboratory course, suitable for chemistry, physics, and other science and engineering majors. The primary aim will be to introduce lasers and their related technology to students in the physical sciences. The goal of the course is to provide a basic working knowledge of laser systems and their associated accessories so that a student could design and execute experiments for which lasers are an essential component. A combination of lecture and lab-work will be used to illustrate the main principals of and uses for lasers in the physical sciences. The tone of the course emphasizes understanding of major concepts rather than fine detail.
Prerequisite(s): (CHM 3120C or (CHM 3120 and CHM 3120L)) or PHY 3101

CHM 4220C - Advanced Organic Chemistry (3 Credits)
A theoretical and experimental treatment of mechanistic, physical organic chemistry concepts from the perspective of modern structural theory, thermodynamics, and kinetics. Examples and data are drawn from the primary literature to explore fundamental organic chemistry.
Prerequisite(s): CHM 2211C or (CHM 2211 and CHM 2211L)

CHM 4230C - Practical NMR Spectroscopy (3 Credits)
This course addresses the application of modern nuclear magnetic resonance (NMR) spectroscopic methods to the structural determination of organic compounds. Both the practical and theoretical aspects of 1D and 2D NMR techniques will be discussed. The course will also extend to the study of biomolecules and should prove useful for both chemists and chemical biologists. Detailed Instructions are provided and each student is expected to carry out his/her own NMR experiments on a 400 MHz NMR spectrometer.
Prerequisite(s): CHM 2211C or (CHM 2211 and CHM 2211L)

CHM 4254C - Medicinal Organic Synthesis (3 Credits)
An exploration of the principles of modern organic synthesis, especially of medicinal compounds, through survey of methodology and design using the retro-synthetic approach. Medicinal compounds are synthesized in the lab, reinforcing the lecture concepts.
Prerequisite(s): CHM 2211C or (CHM 2211 and CHM 2211L)

CHM 4300 - Bio-Organic Chemistry (3 Credits)
The biochemistry of metabolism will be investigated from an organic chemistry perspective, with common organic chemistry reaction mechanisms being identified.
Prerequisite(s): CHM 2211C or (CHM 2211 and CHM 2211L)

CHM 4431 - Statistical Thermodynamics (3 Credits)
Statistical Thermodynamics provides a link between microscopic and bulk properties of matter. Beginning with the derivation of the Boltzmann distribution and the partition function, the partition function is further developed to investigate the translational, rotational and vibrational modes of motion. The equations developed are applied to heat capacities, residual entropies and the equilibrium constant.
Prerequisite(s): (STA 2023 or STA 2037) and MAC 2312 and CHM 3120 and CHM 3120L

CHM 4512 - Computational Modeling (3 Credits)
This class introduces students to different computational methods and models in computational chemistry and molecular simulations. The topics that will be covered include Hartree-Fock, density functional theory, semi-empirical methods, as well as molecular dynamic simulations. Surveys computational methods for studying issues pertinent to electronic structure of molecules and materials, reaction thermodynamics, reaction mechanisms, spectral properties, and molecular dynamics of molecules of biological importance. The laboratory activities include computational experiments to illustrate the applicability of computational methods to chemistry, bio-sciences, and on materials chemistry. These experiments will be carried out Linux-based workstations.
Prerequisite(s): CHM 2211C or (CHM 2211 and CHM 2211L)

CHM 4671 - Bioinorganic Chemistry (3 Credits)
Introduction, from an inorganic perspective, to the structure and function of a variety of metalloproteins and metalloenzymes, concentrating on systems containing transition metals. Emphasis will be placed on the role that metal ion(s) play in the function of biomolecules.
Prerequisite(s): BCH 3023C or BCH 4033C or (BCH 4033 and BCH 4033L)

CHM 4714C - Materials Chemistry (3 Credits)
This course provides an introduction to modern topics in Materials Chemistry such as: synthetic polymers, ionic liquids, supramolecular aggregates, metal-organic frameworks, and nanomaterials. Preparative techniques and physical methods of characterization including x-ray diffraction and thermal analysis will be discussed.
Prerequisite(s): (CHM 2210C or (CHM 2210 and CHM 2210L)) and (CHM 3610 and CHM 3610L)

CHM 4780 - Green Chemistry (3 Credits)
Green Chemistry is a course designed for science majors to understand the science and technology behind chemistry in order to improve the quality of life while preserving the environment. Grounded in the Twelve Principles of Green Chemistry, this course emphasizes sustainability by promoting the development of chemical processes that reduce waste, minimize energy consumption, and eliminate hazardous substances. By the end of the course, students will be able to identify the toxic and hazardous characteristics of chemicals in a chemical process. Through real-world examples, they will also learn how the design of sustainable chemical processes is often constrained by time and budget in the chemical industry. Students will explore innovative techniques and practices that contribute to a more sustainable future, ensuring that scientific advancements benefit both human well-being and environmental health.
Prerequisite(s): (CHM 2211 and CHM 2211L) or CHM 2211C
Attribute(s): SCGR - Sustainability Course Grad Req, Sustainability Course Grad Req

CHM 4905C - Dir Ind Study/Res in Chem (1-4 Credits)
Individual study under the direction of a faculty mentor. Topic will be selected based on mutual agreement between the student and the faculty member.

CHM 4910C - Senior Project in Chemistry (2 Credits)
The first course in the Senior Project in Chemistry and Senior Thesis/Presentation in Chemistry sequence. Students develop and work on a research project under the supervision of a faculty mentor. Students are encouraged to take primary responsibility for projects. Students will be required to complete the appropriate laboratory safety training before being permitted to work in the lab.
Prerequisite(s): (CHM 2211C or (CHM 2211 and CHM 2211L)) and (CHM 3120C or (CHM 3120 and CHM 3120L))

CHM 4912C - Senior Thesis/Pres. Chemistry (2 Credits)
This course is the second course in the Senior Project in Chemistry and Senior Thesis/Presentation in Chemistry sequence. Students in CHM 4912C will continue working on the research project they began in CHM 4910C and write a research report. Students are required to follow the guidelines outlined by their faculty mentor and they are required to complete any revisions and edits as instructed until their research report meets acceptable standards. Students are also required to present their research project at a venue determined by their faculty mentor. Permission of the Department Chair is required and is contingent on the student finding a faculty mentor.
Prerequisite(s): (CHM 4910C

CHM 4930 - Special Topics in Chemistry (2-4 Credits)
Courses will be developed based on topics of current or special interest.

CHM 4932 - Chemistry Senior Seminar (3 Credits)
The senior level 'capstone' experience for chemistry, biochemistry, and forensic science majors. In conference with chemistry faculty, students will devise a senior project/presentation that will emphasize the use of critical thinking and synthesis skills in a chemistry or biochemistry topic. The project may be related to, or have grown out of, a student's undergraduate research experience.
Prerequisite(s): (CHM 2211C or (CHM 2211 and CHM 2211L)) and (CHM 3120C or (CHM 3120 and CHM 3120L))
Attribute(s): CLWS - Coll Lvl English Lang Writing, CLWS - Coll Lvl English Lang Writing