Course	Name	Prerequisite	Credits	Semester in Sequence	Type (R: Requisite; E: Elective; GE: Guided Elective)	Description	Comments
QUIM 3001	**General Chemistry I**	MATE 3018 or MATE 3172	4	1	R	Four credits. Contact hours: 3 of lecture and 3 of laboratory. You must be enrolled in a laboratory section (unless you passed it last year and received authorization from the Chemistry Department to take the course without the lab). Prerequisite: MATH 3171 AND MATH 3172 or MATH 3018. Fundamental principles of Chemistry, with an emphasis on matter and measurements, atoms, molecules and ions, gas phase and solution stoichiometry, thermochemistry, periodic table, chemical bonding, molecular geometry, and gases.	This course must be approved with an A or B in order to take QUIM 3255 or QUIM 3451 and to obtain the bachelors degree in Chemistry.
QUIM 3002	**General Chemistry II**	QUIM 3001	4	2	R	Four credits. Three hours of weekly lecture and three hours of laboratory. Prerequisite: CHEM 3001 (Must be enrolled in a laboratory section). Fundamental principles of Chemistry, with an emphasis on intermolecular forces, solutions, colligative properties, kinetics, chemical equilibrium, acids and bases, buffers, titrations, thermodynamics, electrochemistry, and nuclear chemistry.	This course must be approved with an A or B in order to take QUIM 3255 or QUIM 3451 and to obtain the bachelors degree in Chemistry.
QUIM 3015	**Organic Chemistry Compendium**	QUIM 3002	4	N/A	N/A	Four credits. Three hours of lecture and three hours of laboratory per week. Prerequisite: CHEM 3002 or its equivalent. Study of the structures and reactions of carbon compounds. Compilation of the topics covered in chemistry 3031-3032	Required course for students of the Nutrition and Dietetics Program.
QUIM 3031	**Organic Chemsitry I**	QUIM 3002	4	N/A	N/A	Four credits. Prerequisite: CHEM 3001-2. This semester, you will study	This course could substitute for QUIM

						how the three-dimensional structure and electronic distribution influence the chemical and physical properties of organic species. You will develop this knowledge through the study of acid-base reactions, electrophilic addition of alkenes, alkynes, and dienes, and electrophilic substitution of aromatic compounds. In this process, you will learn to represent organic molecules using drawings and models, distinguish between isomers, generate mechanisms to represent electron movement in reactions, and predict the major products. Additionally, you will acquire a basic and practical understanding of infrared spectroscopy and proton nuclear magnetic resonance techniques.	3451 if the student obtains an A or B and takes QUIM 4025. This exception is only made for students who were not originally classified in Chemistry and who took Q3031 as a requirement of their original program.
QUIM 3032	**Organic Chemsitry II**	QUIM 3031 or QUIM 3451	4	N/A	N/A	Four credits. Prerequisite: CHEM 3031. The proposed curriculum aims to develop logical reasoning skills, promote the integration of knowledge, and enhance understanding of the scope of Organic Chemistry in health-related sciences. You will study nucleophilic substitution, elimination, nucleophilic addition, oxidation, and reduction reactions. You will analyze the relationship between organic structure and chemical reactivity. You will apply the knowledge acquired in the course to study the total synthesis of cholesterol and the biosynthesis of lanosterol.	This course could substitute for QUIM 3452 if the student obtains an A or B and takes QUIM 4025. This exception is only made for students who were not originally classified in Chemistry and who took Q3032 as a requirement of their original program.
QUIM 3255	**Chemical Analysis I**	QUIM 3002	4	5 or 3	R	Four credits. Three (3) hours per week of synchronous and asynchronous lectures, and six (6) hours per week of synchronous and asynchronous laboratory experiences. Prerequisite: CHEM 3001-CHEM 3002. This course is intended for students pursuing higher	

						studies in chemical sciences. It is an introductory course to the principles, practices, and methods of chemical analysis that transcend multiple scientific disciplines. The course emphasizes learning classical and instrumental methods of quantitative chemical analysis, how to perform quantitative measurements, how to process data to obtain reliable and valid information from experimental results. The laboratory component will provide students with the opportunity to learn new techniques and skills, self-assess their mastery of the content, and validate their results with detailed and in-depth statistical reasoning.	
QUIM 3451	**Organic Chemistry I**	QUIM 3002	4	3 or 5	R	Four credits. Prerequisite: CHEM 3002. Co-requisite: CHEM 3451L. This course is designed for students who will use chemistry in their careers. These careers may be related to research, teaching, biochemistry, industry, and administration in academic, industrial, or government institutions. The course includes the following: Concepts of bond formation, atomic orbital hybridization, sigma and pi bonds in the formation of organic compounds such as alkanes, alkenes, alkynes, alcohols, and alkyl halides. Factors determining relative physical properties based on molecular structure. Different types of isomerism based on molecular and/or structural formulas (e.g., conformational, configurational, functional, etc.). Products and mechanisms of reactions involving these functional groups (addition,	

						substitution, elimination, acid-base, redox), as well as the energy factors that control the mechanisms and how to represent them on an energy profile. The relative stability of chemical species such as free radicals, carbocations, and carbanions. Integration of various reactions involving these functional groups in a sequence for the design of a synthesis.	
QUIM 3452	**Organic Chemistry II**	QUIM 3451	4	4 or 6	R	Four credits. Three hours of weekly lecture and 1 hour of discussion. Prerequisite: CHEM 3451 (Organic Chemistry I) CHEM 3451L (Organic Chemistry I Laboratory). Co-requisite: CHEM 3452L. This course is designed for students who will use chemistry in their careers. These careers may be related to research, teaching, biochemistry, industry, and administration in academic, industrial, or government institutions. The course includes the following: Theory and study of conjugated systems and the concept of aromaticity, focusing on the chemistry of benzene and its derivatives. Study of the mechanisms and products of aromatic electrophilic substitution reactions. Structure, nomenclature, mechanisms, and reactions of carbonyl compounds (such as aldehydes, ketones, carboxylic acids, and carboxylic acid derivatives) and other functional groups such as amines. Integration of various reactions involving these functional groups in a sequence for the design of a synthesis. Analysis of infrared, UV, mass	

						spectrometry, and proton and carbon-13 nuclear magnetic resonance spectra of organic species. Integration of information obtained from these analyses to elucidate structures of organic species.	
QUIM 4000	**Inorganic Chemistry**	QUIM 3452 (QUIM3032); QUIM 3255 (QUIM3025)	3	7 or 8	R	Three credits. Three hours of weekly lecture. Prerequisite: Organic Chemistry (CHEM 3451-2 or CHEM 3031-2), Analytical Chemistry (CHEM 3255 or CHEM 3025). Study of the electronic structure of atoms and molecules, periodic relationships, molecular shape and symmetry, orbital theory, chemical bonding models, ionic and metallic solids, semiconductors, acid-base chemistry, redox reactions, structure and reactions of inorganic compounds, coordination compounds, spectroscopy of coordination compounds, and reactions of coordination compounds.	
QUIM 4006	**Inorganic Chemistry II**	QUIM 4000; QUIM4041	2	N/A	GE	Two credits. Two hours of weekly lecture. Prerequisite: CHEM 4000, CHEM 4041. Chemistry of transition metals, inorganic cluster compounds, symmetry and group theory in inorganic chemistry, bioinorganic chemistry, and nuclear chemistry.	
QUIM 4015	**Instrumental Analysis**	QUIM 3255 (QUIM 3025) or QUIM3452 (QUIM3032)	4	6 or 4	R	Four credits. Three hours of class and six hours of laboratory. Prerequisite: CHEM 3255, CHEM 3451-52. Chemical and instrumental methods of analysis, both qualitative and quantitative. Fundamental principles related to the use of analytical methods and modern instrumentation.	
QUIM 4025	**Methods in Organic**	QUIM 3452 or QUIM 3032	3	N/A	GE	Three credits. Three hours of weekly lecture. Prerequisite: CHEM 3032 and CHEM 3452. Study of the spectral	

	Chemistry (Spectroscopy)					properties of organic molecules through their UV, IR, NMR, and mass spectra, and discussion of the methods used in the separation and identification of organic compounds. This course is designed for individuals with a technical background who wish to learn how to identify organic compounds using the complementary information provided by three types of spectra: mass spectrometry (MS), infrared spectroscopy (IR), and nuclear magnetic resonance (NMR).	
QUIM 4035	**Intermediate Organic Chemistry**	QUIM 3452 or QUIM 3032	3	N/A	GE	Three credits. Three hours of weekly lecture. Prerequisite: CHEM 3032 or CHEM 3452. This course covers intermediate concepts of organic chemistry for advanced undergraduate students, with an emphasis on synthetic organic chemistry. It is a prerequisite for students to have completed a year-long course in second-year organic chemistry. Any good textbook on organic chemistry or chemistry will be helpful for reviewing the fundamentals, and students are strongly recommended to do so. After completing this course, the student will have a stronger foundation in the basic principles of organic chemistry and exposure to concepts that are currently of great importance in synthetic organic chemistry. It is expected that the undergraduate student will be better prepared for a conventional graduate-level organic chemistry course and will be brought up to date on the basic principles of organic chemistry. The student will also gain a better	

						understanding of the primary literature in Organic Chemistry.	
QUIM 4041	**Physical Chemistry I**	QUIM 3255 & QUIM 3452 & FISI 3012 & MATE 3152	3	7	R	Three credits. Three hours of weekly lecture and discussion. Prerequisite: MATE 3152, FISI 3012, QUIM 3255, QUIM 3452. This class covers chemical thermodynamics, which introduces the laws of classical thermodynamics and their applications to the properties of gases, liquids, and solids, as well as solutions, phases, and chemical equilibria.	
QUIM 4042	**Physical Chemistry II**	QUIM 4041, QUIM3063	3	8	R	Three credits. Three hours of weekly lecture. Prerequisite: QUIM 4041, MATE 3152, FISI 3012, QUIM 3255, QUIM 3452. This class covers the fundamentals of quantum mechanics as applied to atoms, chemical bonding, and molecules, as well as the basics of spectroscopy.	
QUIM 4043	**Intermediate Laboratory I**	QUIM 4041 or concurrent	2	7	R	Two credits. Prerequisite: University Physics II (FISI 3012), Calculus II (MATE 3152), Analytical Chemistry I (QUIM 3255), Organic Chemistry II, Physical Chemistry I (QUIM 4041). The material covers the discussion of theory and methods for thermodynamics, chemical equilibrium, electrochemistry, viscosity, and phase diagrams experiments and practices. The content of this laboratory includes practices related to the discussion material in the lecture course, QUIM 4041.	
QUIM 4044	**Intermediate Laboratory II**	QUIM 4042 or concurrent	2	8	R	Two credits. Prerequisite: Physical Chemistry I (QUIM 4041) Physical Chemistry Laboratory I (QUIM 4043), Physical Chemistry II (QUIM 4042). The material covers the discussion of theory and methods for	

						experiments and practices in quantum mechanics, spectroscopy, and chemical kinetics. Emphasis is placed on the use of techniques in physical and analytical chemistry, as well as data analysis and interpretation. The content of this laboratory includes practices related to the discussion material in the lecture course, QUIM 4042.	
QUIM 4055	**Biochemistry**	QUIM 3452 or QUIM 3032	3	5 or 7	R	Three credits. Prerequisite: Organic Chemistry I and II. The three-credit lecture will provide fundamental concepts on the structural organization, stability, and function of proteins and bioenergetics (enzymology). Essential methods enabling scientific research will also be discussed. Emphasis will be placed on the protein folding problem.	
QUIM 4061	**Chemical Bibliography**	QUIM3452 or QUIM3255	2	N/A	GE	Two credits. Two hours of lecture per week. Cataloging, use, and importance of various sources of chemical bibliography. Individual research work on bibliographic investigation.	
QUIM 4117	**Chemistry Tutoring**	QUIM 3001or concurrent	1	N/A	E	One credit. It can be repeated for a maximum of two credits, which will count as free electives. Prerequisite: permission from the director. Five hours per week of conventional chemistry tutoring, either in a self-tutorial laboratory or in the personalized instruction system, under the constant supervision of a professor. Tutoring, experimental work supervision, safety rules, handling of reagents, preparation of equipment, and materials from the audiovisual center.	
QUIM 4605	**Introduction to Theoretical Chemistry**	QUIM 3002, FISI 3012, MATE 3152.	3	N/A	GE	Three credits. Three hours of lecture per week. Prerequisite: QUIM 3002, FISI 3012, MATE 3152. Description of	

						chemical systems in terms of their equations of state and/or differential equations. The concept of equilibrium or stability is investigated through calculation and variations. Kinetic processes are described by differential equations. Special functions arise when applying mathematical methods to chemical systems exhibiting diffusion.	
QUIM 4865	**Biochemistry Techniques**	QUIM 3255 & QUIM 3452	2	N/A	GE	Two credits. One hour of lecture and four hours of laboratory per week. Prerequisite: QUIM 4055 or concurrent enrollment. The application of chemical analysis to biological systems. Purification and characterization of proteins, lipids, and nucleic acids. Chromatographic and electrophoretic techniques used in biochemistry. Determination of parameters in enzyme kinetics.	
QUIM 4999	**Undergraduate Research**	QUIM 3001	1-3	N/A	GE	From one to three credits. Maximum of 6 credits. Laboratory hours to be determined by agreement. Prerequisite: permission from the department chair. The student will work on an original research problem under the guidance of a faculty member.	A maximum of four credits are counted as guided electives. Six credits may be taken in total, but the two credits in excess of four are counted as a free elective.
QUIM 5166	**Introduction to Polymer Chemistry**	QUIM3452 (or QUIM3032) & QUIM3255 (or QUIM3025)	3	N/A	GE	Three credits. Three hours of lecture per week. Prerequisites: QUIM 3001-3002, 3031-3032 or 3451-3452, QUIM 3025 or 3255; to be taken concurrently with QUIM 4041. Types of polymer materials; polymer synthesis and reactions; physical and chemical characterization; technological processes and modern applications. Hands-on experiences in polymer synthesis and characterization.	

QUIM 5995	**Selected Topics in Chemistry**	QUIM3452 or QUIM3255	1-3	N/A	GE	From one to three credits. One to three hours of lecture per week. Prerequisite: recommendation from the director. Selected topics in analytical chemistry, biochemistry, inorganic chemistry, physical chemistry, organic chemistry, polymers, industrial chemistry, environmental chemistry, laboratory safety.	Possible topics are (but not limited to): Cosmetics Chemistry, Food Chemistry, Forensic Chemistry, Forensic Chemistry Techniques, Medicinal Chemistry, Metals in Medicine, Bioinorganic Chemistry, Computational Chemistry, Supramolecular Chemistry, Chemistry Materials: Aerospace Applications , Natural Medicinal Products, Nanochemistry, Environmental Chemistry, Industrial Chemistry.