

Guide to Terms

annually = course offered at least once a year during fall or spring semester

occasionally = course offered less frequently than once a year, contact advisor if interested

Prerequisite = course must be completed

Co-requisite = course must either be completed or be taken concurrently

CHE 099/Orientation to Chemistry

0 course units

(fall)

Restriction: Reserved for Chemistry majors

Required of all entering chemistry majors, this course provides an orientation to The College of New Jersey community; to chemistry faculty; and to the degree programs offered by the Department of Chemistry including, among other topics, advisement opportunities, curriculum and scheduling, laboratory safety procedures, facilities, introduction to the library, professional societies and student affiliates, career options, and the American Chemical Society Code of Ethics. Grade is P/U and course is a requirement for matriculating freshmen.

CHE 111/Biochemistry and the Human Body

1 course unit

(with laboratory)

(fall, summer)

Restricted to Nursing students.

An introduction to general inorganic, organic and biochemistry, which explores the relationships between chemical processes and normal structure and function in the human body. Laboratory experiments investigate chemical reactions and develop techniques important for further study of human biology in a nursing clinical context.

CHE 201 General Chemistry I

1 course units

(with laboratory)

(fall, spring, Summer Session I)

Co-requisite: MAT 096 or SAT \geq 650

Laws and theories of matter in its various states: atomic and molecular structure from quantum and orbital interpretations; kinetics and equilibrium; periodicity and properties. Quantitative experiments coordinated with lectures. A working knowledge of elementary algebra is required. Successful completion of a high school chemistry course is strongly recommended. Enrollment in CHE 201 and CHE 202 requires that a student have a minimum of C- in the pre-requisite courses.

CHE 202/General Chemistry II

1 course units

(with laboratory)

(fall, spring, summer session II)

Prerequisite : CHE 201 or HON 201 with minimum grade of C-, or waived by AP score of 4 or higher

Laws and theories of matter in its various states: atomic and molecular structure from quantum and orbital interpretations; kinetics and equilibrium; periodicity and properties. Quantitative experiments coordinated with lectures. A working knowledge of elementary algebra is required. Successful completion of a high school chemistry course is strongly recommended.

CHE 310/Analytical Chemistry

1 course unit

(with laboratory)

(annually)

Prerequisite: CHE 202 with minimum grade of C-

A study of quantitative analysis including statistical evaluation and interpretation of analytical data, chemical equilibrium calculations, volumetric determinations, and electrochemical analysis.

CHE 316/ Chemistry Seminar I

0.25 course units

(fall, spring)

Restriction: Reserved for Chemistry majors

Prerequisite: CHE 099

A second seminar course designed for chemistry majors. Included in this course is an exploration of career options within the field of chemistry, ChemDraw and other software computer programs needed by the chemist. Other topics include use of the chemical literature and the library computer search program *SciFinder Scholar*. Professionalism and ethics, resumes, and internship opportunities and departmental research will also be discussed. Grade is P/U and the course is required for graduation.

CHE 317/ Chemistry Seminar II

0.25 course units

(fall, spring)

Prerequisite: CHE 316

Restriction: Reserved for Chemistry majors

Designed to prepare students for careers in the chemical field. Topics may include graduate/professional school applications and opportunities, laboratory safety and ethics, interview skills, scientific resume writing, cover letters, networking skills, information literacy and presentations on different chemistry topics. Grade is P/U and the course is required for graduation.

CHE 331/Organic Chemistry I

1 course units

(with laboratory)

(fall, spring, summer session I)

Restriction: Required for chemistry majors, open to others on space available basis

Prerequisite: CHE 202 with minimum grade of C-

CHE331 is the first of a 2-semester sequence at the sophomore-junior level. The lecture will focus on the basic principles of organic chemistry (bonding, molecular shapes, stereochemistry), reactions of fundamental classes of organic compounds, and an introduction to spectroscopic structure determination methods. The lab will focus on basic laboratory techniques (separation, purification, identification) employed in organic chemistry. In addition, components will involve experiments or workshops designed to reinforce principles from lecture.

CHE 332/Organic Chemistry II

1 course units

(with laboratory)

(fall, spring, summer session II)

Prerequisite: CHE 331 with minimum grade of C-

CHE 332 is the second of a two-semester sequence at the sophomore-junior level for chemistry and biology majors and pre-health career students. The course will focus on the reactions of aromatic compounds, carbonyl compounds, carboxylic acid derivatives, the chemistry of amines and phenols, and special topics including chemical applications of biological compounds. The lab will focus on advanced laboratory techniques and synthesis.

CHE 350/Essentials of Biochemistry

1 course unit

(fall)

Restriction: Not open to chemistry majors

Prerequisites: BIO 211 **and** CHE 332

A one-semester lecture course covering amino acids and protein structure and function, intermediary metabolism, lipids, carbohydrates, and nucleic acids. Designed for non-Chemistry majors

CHE 360/Forensic Chemistry

1 course unit

(with laboratory)

(fall)

Prerequisite: CHE 332

This course approaches the challenges, methods, and analyses of forensic science from a fundamental, chemical perspective. Topics include drug analysis, arson investigation, questioned document analysis, and the analysis of paint and gunshot residue samples.

CHE 370 Selected Topics in Chemistry **1 course unit**

(3 class hours, or 3 class hours and 3 lab hours, or 2 class hours and 4 lab hours)
(occasionally)

Prerequisite: Approval of department chair

Selected topics of current relevance and interest in chemistry will be presented by faculty and guest lecturers with special areas of competency. Topics will be announced in advance.

CHE 371/Quantum Chemistry **1 course unit**

(with laboratory)

(spring)

Prerequisites: MAT 128, PHY 202, **and** CHE 331

Co-requisite: CHE 310

A study of quantum mechanics as it applies to atoms and molecules, chemical bonding and spectroscopy.

CHE 372/Chemical Thermodynamics **1 course unit**

(with laboratory)

(fall)

Prerequisites: MAT 128, PHY 202, CHE 310, **and** CHE 331

A study of thermodynamics, kinetics, statistical mechanics, and other areas fundamental to an understanding of the physical behavior of matter.

CHE 393/Independent Research I **0.5-1 course unit**

(fall, spring)

Prerequisites: 13.5 course units, permission of the instructor

This course is designed as a first semester research experience for students who are majoring in chemistry, and focuses on mentored undergraduate research under the close supervision of a faculty member.

CHE 399/Internship in Chemistry **variable course units**

(fall, spring)

Prerequisite: Permission of department chair

This arrangement provides an opportunity for practical field experience. See department chair for further information.

CHE 410/Instrumental Analysis **1 course unit**

(with laboratory)

(fall)

Prerequisites: CHE 310 **and** CHE 371

A study of principles, applications, and operations of chemical instrumentation.

CHE 415/Separation Science **1 course unit**

(occasionally)

Prerequisite: CHE 371

Separation techniques to be covered include wet-chemistry separation and instrumental separation. Separation instrumentation is emphasized and includes capillary electrophoresis and a variety of chromatograph. Hands-on experiments are arranged for students to practice chemical separation in the laboratory.

CHE 430/Biochemistry **1 course unit**

(with laboratory)

(annually)

Prerequisites: CHE 332 **and** CHE 310

The fundamental principles of chemistry as they apply to biological processes with emphasis on

proteomics. Designed for chemistry majors with little to no background in biology or genetics. The laboratory focuses on the development and use of lab techniques and computer skills critical to the study of biochemistry.

CHE 451/Inorganic Chemistry—Structure and Bonding **1 course unit**

(with laboratory)

(odd years, spring)

Co-requisite: CHE 371

A study of inorganic chemistry exploring modern concepts of structure and bonding with considerable emphasis placed on computer-aided molecular modeling, crystallography and spectroscopy (UV and IR).

CHE 452/Inorganic Chemistry—Reactions and Mechanisms **1 course unit**

(with laboratory)

(even years, spring)

Prerequisites: CHE 332

Co-requisite: CHE 372

A study of inorganic chemistry exploring modern concepts of synthesis and reactivity with focus placed on reaction mechanism and the role of inorganic complexes in chemical catalysis. Analysis of mechanism by spectroscopic techniques is incorporated.

CHE 457/Organometallic Chemistry Laboratory **1 course unit**

(with laboratory)

(occasionally)

Prerequisites: CHE 371, CHE 372 and CHE 451

A study of modern concepts of structure and bonding in organotransition metal chemistry emphasizing synthetic methods, catalysis, and reaction mechanisms.

CHE 470/Selected Topics in Chemistry **1 course unit**

(3 class hours, or 3 class hours and 3 lab hours, or 2 class hours and 4 lab hours)

(occasionally)

Prerequisite: CHE 332 and permission of department chair

Selected topics of current relevance and interest in chemistry will be presented by faculty and guest lecturers with special areas of competency. Recent topics include mass spectrometry of biomolecules, materials chemistry, bioorganic chemistry, spectroscopy, medicinal chemistry, stereochemistry, and heterocyclic chemistry. Topics will be announced in advance.

CHE 471/Forensic Applications of Mass Spectrometry **1 course unit**

(with laboratory)

(spring)

Prerequisite: CHE 332

This course discusses mass spectrometry instrumentation, and the interpretation of mass spectra obtained using GC/MS, using forensic applications and examples such as arson investigations and drug analyses.

CHE 474/Special Topics in Biochemistry **1 course unit**

(Lecture and Lab; Other)

(occasionally)

Prerequisite: CHE 331 AND (CHE 371 or CHE 372)

Co-requisite: CHE 430

Faculty members and/or guest lecturers will cover topics in areas of Biochemistry within their research experience, expertise, or special interests. Topics and format for the course will be announced in advance.

CHE 476/Special Topics in Organic Chemistry **1 course unit**

(Lecture and Lab; Other)

(occasionally)

Prerequisite: CHE 332

Faculty members and/or guest lecturers will cover topics in Organic Chemistry within their research experience, expertise, or special interests. Topics and format for the course will be announced in advance.

CHE 478/Special Topics in Condensed Matter

1 course unit

(Lecture/Discussion and Lab; Other)

(annually)

Prerequisite: CHE 202 (minimum grade of C-), MAT 128, PHY 202, **and** (CHE 371 OR PHY 321)

Faculty members and/or guest lecturers will cover topics in magnetism, energy materials, semiconductors and superconductors, biophysics, crystal engineering, thermodynamic or spectroscopic characterization of materials, or other areas related to material science and condensed matter physics. Topics and format for the course will be announced in advance.

CHE 490/Student Teaching Chemistry

2 course units

(fall, spring)

Prerequisite: Meeting all criteria for admission to student teaching

Student teaching during the senior year. Teaching is conducted in approved public schools, and supervised and observed by college and public school teachers. Students learn through observation and participation in the classroom, and through responsible teaching.

CHE 493/Independent Research II

variable course units

(fall, spring)

Prerequisites: permission of instructor

This course is for students who conduct undergraduate research under close supervision of a faculty member. One semester of CHE 493 may be used to satisfy a writing intensive requirement; CHE 493 may be repeated for credit for those students who desire to do more than two semesters of mentored undergraduate research.