CHEMISTRY (CHEM)

CHEM 1106 Chemistry for Allied Health Sciences Laboratory 1 Credit
Department: College of Arts and Sciences
Laboratory to accompany a survey of elementary inorganic/organic chemistry and gas laws for allied health science majors. Designed for students majoring in health sciences.
Prerequisite(s): MATH 1314 or MATH 2311 or MATH 2312 or MATH 2413
Corequisite(s): CHEM 1306
Grade Mode(s): Standard Letter, Registrar do not use FN, Registrar do not use FS

CHEM 1108 Biochemistry for Allied Health Sciences Laboratory 1 Credit
Department: College of Arts and Sciences
Laboratory to accompany a survey of elementary inorganic/organic chemistry and gas laws for allied health science majors. Designed for students majoring in health sciences. Corequisite: CHEM 1306. Prerequisites: CHEM 1306, CHEM 1106. Offered: Summer
Prerequisite(s): CHEM 1306 and CHEM 1106
Corequisite(s): CHEM 1308
Grade Mode(s): Standard Letter, Registrar do not use FN, Registrar do not use FS

CHEM 1111 General Chemistry I Laboratory 1 Credit
Department: College of Arts and Sciences
Laboratory to accompany an algebra based review of chemical laws and theory for science, engineering and preprofessional majors.
Prerequisite(s): MATH 1314 or MATH 2312 or MATH 2311 or MATH 2413
Corequisite(s): CHEM 1311
Grade Mode(s): Standard Letter, Registrar do not use FN, Registrar do not use FS

CHEM 1112 General Chemistry II Laboratory 1 Credit
Department: College of Arts and Sciences
Laboratory to accompany an algebra based review of chemical laws and theory for science, engineering and preprofessional majors.
Prerequisite(s): MATH 1314 or MATH 2312 or MATH 2311 or MATH 2413
Corequisite(s): CHEM 1312
Grade Mode(s): Standard Letter, Registrar do not use FN, Registrar do not use FS

CHEM 1171 Supplemental Lab 1 Credit
Department: College of Arts and Sciences
Grade Mode(s): Standard Letter, Registrar do not use FN, Registrar do not use FS

CHEM 1306 Chemistry for Allied Health Sciences 3 Credits
Department: College of Arts and Sciences
Survey of elementary inorganic/organic chemistry and gas laws for allied health science majors.
Prerequisite(s): MATH 1314
Grade Mode(s): Standard Letter, Registrar do not use FN, Registrar do not use FS

CHEM 1308 Biochemistry for Allied Health Sciences 3 Credits
Department: College of Arts and Sciences
Elementary survey of structure, function and metabolic processes of molecules in organisms. Designed for students majoring in health sciences.
Prerequisite(s): CHEM 1306 and CHEM 1106
Grade Mode(s): Standard Letter, Registrar do not use FN, Registrar do not use FS

CHEM 1311 General Chemistry I 3 Credits
Department: College of Arts and Sciences
Algebra-based review of chemical laws and theory for science, engineering and preprofessional majors.
Prerequisite(s): MATH 1314 or MATH 2312 or MATH 2413 or MATH 2311
Grade Mode(s): Standard Letter, Registrar do not use FN, Registrar do not use FS

CHEM 1312 General Chemistry II 3 Credits
Department: College of Arts and Sciences
A continuation of CHEM 1311. Theories of solutions, equilibrium, thermodynamics and kinetics.
Prerequisite(s): CHEM 1311 and CHEM 1111 or CHEM 1411
Grade Mode(s): Standard Letter, Registrar do not use FN, Registrar do not use FS

CHEM 2411 Integrated Sciences 4 Credits
Department: College of Arts and Sciences
An integrated approach to understanding the fundamentals of energy, electromagnetic radiation, atomic structure and chemical bonding. Applications of these principles in living systems, environmental science and technology will be emphasized. This course is part of a four course science sequence designed to provide students a basic understanding of the concepts and methodologies employed throughout the fields of science.
Prerequisite(s): MATH 1314
Grade Mode(s): Standard Letter, Registrar do not use FN, Registrar do not use FS

CHEM 3111 Organic Chemistry I Laboratory 1 Credit
Department: College of Arts and Sciences
Laboratory to accompany a course on current theories and chemical principles as they relate to the field of structure and reaction of the various types of organic compounds.
Prerequisite(s): CHEM 1412 or (CHEM 1312 and CHEM 1112)
Corequisite(s): CHEM 3311
Grade Mode(s): Standard Letter, Registrar do not use FN, Registrar do not use FS

CHEM 3112 Organic Chemistry II Laboratory 1 Credit
Department: College of Arts and Sciences
Laboratory to accompany CHEM 3312, a continuation of CHEM 3111.
Prerequisite(s): CHEM 3411 or (CHEM 3311 and CHEM 3111)
Corequisite(s): CHEM 3312
Grade Mode(s): Standard Letter, Registrar do not use FN, Registrar do not use FS
CHEM 3131 Inorganic Chemistry I Laboratory 1 Credit  
Department: College of Arts and Sciences  
A laboratory to accompany CHEM 3331 Inorganic Chemistry. This laboratory is designed for laboratory technicians to introduce synthesis, purification and analysis of inorganic compounds.  
Prerequisite(s): CHEM 1412 or (CHEM 1312 and CHEM 1112) and CHEM 3331  
Grade Mode(s): Standard Letter, Registrar do not use FN, Registrar do not use FS  

CHEM 3311 Organic Chemistry I 3 Credits  
Department: College of Arts and Sciences  
Current theories and chemical principles as they relate to the field of structure and reaction of the various types of organic compounds.  
Prerequisite(s): CHEM 1412 or (CHEM 1312 and CHEM 1112)  
Corequisite(s): CHEM 3111  
Grade Mode(s): Standard Letter, Registrar do not use FN, Registrar do not use FS  

CHEM 3312 Organic Chemistry II 3 Credits  
Department: College of Arts and Sciences  
A continuation of CHEM 3311.  
Prerequisite(s): CHEM 3411 or (CHEM 3311 and CHEM 3111)  
Corequisite(s): CHEM 3112  
Grade Mode(s): Standard Letter, Registrar do not use FN, Registrar do not use FS  

CHEM 3331 Inorganic Chemistry 3 Credits  
Department: College of Arts and Sciences  
Generalization involving atomic and nuclear theory; properties of the elements with emphasis on periodicity; non-aqueous solvents, acids, bases, oxidation-reduction, etc.  
Prerequisite(s): CHEM 1412 or (CHEM 1311 and CHEM 1111)  
Grade Mode(s): Standard Letter, Registrar do not use FN, Registrar do not use FS  

CHEM 3401 Quantitative Analysis 4 Credits  
Department: College of Arts and Sciences  
Theory and practice of analytical chemistry utilizing gravimetric and titrimetric techniques.  
Prerequisite(s): CHEM 1412 or (CHEM 1312 and CHEM 1112)  
Grade Mode(s): Standard Letter, Registrar do not use FN, Registrar do not use FS  

CHEM 3415 General Biochemistry 4 Credits  
Department: College of Arts and Sciences  
A one semester overview of the chemical processes in living organisms. The class deals with the structure and function of cellular molecules, proteins, carbohydrates, lipids, nucleic acids etc. Designed for non-biochemistry majors.  
Prerequisite(s): CHEM 1412 or (CHEM 1312 and CHEM 1112)  
Grade Mode(s): Standard Letter, Registrar do not use FN, Registrar do not use FS  

CHEM 3491 Intro to Forensic Sciences 4 Credits  
Department: College of Arts and Sciences  
A survey of the basic principals of forensic science. Oral presentations and projects required.  
Grade Mode(s): Standard Letter, Registrar do not use FN, Registrar do not use FS  

CHEM 4101 Special Topics Chemistry 1 Credit  
Department: College of Arts and Sciences  
Topics in under-graduate analytical, inorganic, organic and physical chemistry or biochemistry. Library and/or laboratory work and conferences with a faculty member. With permission of the department head, student may repeat the course for credit when the area of study is different. Prerequisite: Approval of instructor and department chair  
May be Repeated for a maximum of 6 hours  
Grade Mode(s): Standard Letter, Registrar do not use FN, Registrar do not use FS  

CHEM 4131 Physical Lab 1 Credit  
Department: College of Arts and Sciences  
Laboratory applications of modern theory in physical chemistry.  
Prerequisite(s): CHEM 3401  
Prerequisite(s)/Corequisite(s): CHEM 4311  
Grade Mode(s): Standard Letter, Registrar do not use FN, Registrar do not use FS  

CHEM 4132 Physical Lab 1 Credit  
Department: College of Arts and Sciences  
Continuation of CHEM 4131.  
Prerequisite(s): CHEM 4131 and CHEM 4312  
Grade Mode(s): Standard Letter, Registrar do not use FN, Registrar do not use FS  

CHEM 4341 Inorganic Chemistry II Laboratory 1 Credit  
Department: College of Arts and Sciences  
A laboratory to accompany CHEM 4341 Inorganic Chemistry. This laboratory is designed for chemistry majors to introduce synthesis, purification and analysis of transition metal complexes.  
Prerequisite(s): CHEM 3331 and CHEM 3131 or CHEM 4341  
Grade Mode(s): Standard Letter, Registrar do not use FN, Registrar do not use FS  

CHEM 4271 Intro Research 2 Credits  
Department: College of Arts and Sciences  
Topics in under-graduate analytical, inorganic, organic and physical chemistry or biochemistry. Library and/or laboratory work and conferences with a faculty member. With permission of the department head, student may repeat the course for credit when the area of study is different. Prerequisite: Approval of instructor and department chair  
May be Repeated for a maximum of 10 hours  
Restriction(s):  
Students with a class of Freshman may not enroll.  
Grade Mode(s): Standard Letter, Registrar do not use FN, Registrar do not use FS  

CHEM 4301 Special Topics Chemistry 3 Credits  
Department: College of Arts and Sciences  
Topics in under-graduate analytical, inorganic, organic and physical chemistry or biochemistry. Library and/or laboratory work and conferences with a faculty member. With permission of the department head, student may repeat the course for credit when the area of study is different. Prerequisite: Approval of instructor and department chair  
May be Repeated for a maximum of 9 hours  
Grade Mode(s): Standard Letter, Registrar do not use FN, Registrar do not use FS
CHEM 4311 Physical Chemistry I 3 Credits
Department: College of Arts and Sciences
Modern chemical theory as applied to gases, liquids, solids and solutions.
Prerequisite(s): CHEM 1412 and (PHYS 1402 or PHYS 2426) and (MATH 3435 or MATH 2414)
Grade Mode(s): Standard Letter, Registrar do not use FN, Registrar do not use FS

CHEM 4312 Physical Chemistry II 3 Credits
Department: College of Arts and Sciences
A continuation of CHEM 4311.
Prerequisite(s): CHEM 4311
Grade Mode(s): Standard Letter, Registrar do not use FN, Registrar do not use FS

CHEM 4315 Biophysical Chemistry 3 Credits
Department: College of Arts and Sciences
An overview of the structural and physical properties of biomacromolecules. Includes discussions on protein stability, substrate binding equilibria and structure determination by both experimental and computational methods.
Prerequisite(s): MATH 2413 and CHEM 3412
Corequisite(s): CHEM 4131
Grade Mode(s): Standard Letter, Registrar do not use FN, Registrar do not use FS

CHEM 4341 Inorganic 3 Credits
Department: College of Arts and Sciences
The quantized atom, valency and the chemical bond, and coordination chemistry with applications to biological systems.
Prerequisite(s): CHEM 3331 and CHEM 4311
Grade Mode(s): Standard Letter, Registrar do not use FN, Registrar do not use FS

CHEM 4371 Intro Research 3 Credits
Department: College of Arts and Sciences
Problems are on the undergraduate level and emphasizes research techniques. With approval of the department head, these courses may be repeated for credit.
May be Repeated for a maximum of 9 hours
Grade Mode(s): Standard Letter, Registrar do not use FN, Registrar do not use FS

CHEM 4381 Chemical Communication 3 Credits
Department: College of Arts and Sciences
Overview of the fundamental aspects of scientific communication as it pertains to Chemistry, including chemical literature, scientific writing, oral presentations and poster communications.
Restriction(s):
Enrollment limited to students with a class of Senior.
Enrollment is limited to students with a major in Biochemistry, Chemistry, Chemistry or Forensic Chemistry.
Grade Mode(s): Standard Letter, Registrar do not use FN, Registrar do not use FS

CHEM 4401 Special Topics 4 Credits
Department: College of Arts and Sciences
+Topics in undergraduate analytical, inorganic, organic and physical chemistry or biochemistry. Library and/or laboratory work and conferences with a faculty member. With permission of the department head, student may repeat the course for credit when the area of study is different.
May be Repeated for a maximum of 8 hours
Grade Mode(s): Standard Letter, Registrar do not use FN, Registrar do not use FS

CHEM 4411 Biochemistry I 4 Credits
Department: College of Arts and Sciences
Structures chemistry and functions of biological compounds. A survey of the detailed structures, chemistry and functions of the various classes of biologically important compounds.
Prerequisite(s): CHEM 3412
Grade Mode(s): Standard Letter, Registrar do not use FN, Registrar do not use FS

CHEM 4412 Biochemistry II 4 Credits
Department: College of Arts and Sciences
A detailed survey of metabolic pathways and processes.
Prerequisite(s): CHEM 4411
Grade Mode(s): Standard Letter, Registrar do not use FN, Registrar do not use FS

CHEM 4461 Instrumental Methods of Analysis 4 Credits
Department: College of Arts and Sciences
Instrumental techniques of chemistry. Theory and practice in modern analytical methods.
Prerequisite(s): CHEM 3401 and CHEM 3412 and CHEM 4311 and PHYS 3350
Grade Mode(s): Standard Letter, Registrar do not use FN, Registrar do not use FS

CHEM 4471 Introduction to Research 4 Credits
Department: College of Arts and Sciences
Problems are on the undergraduate level and emphasizes research techniques. With approval of the department head, these courses may be repeated for credit.
May be Repeated for a maximum of 8 hours
Grade Mode(s): Standard Letter, Registrar do not use FN, Registrar do not use FS

CHEM 4481 Environmental Analysis 4 Credits
Department: College of Arts and Sciences
The causes of environmental pollution, how environmental samples are collected and analyzed, and current governmental regulations concerning pollutants.
Prerequisite(s): CHEM 3401
Grade Mode(s): Standard Letter, Registrar do not use FN, Registrar do not use FS

CHEM 4491 Forensic Chemistry 4 Credits
Department: College of Arts and Sciences
A survey of and practice in the principal areas of forensic chemistry including microchemistry and microspectrophotometry. Topics of current interest will be introduced.
Prerequisite(s): CHEM 3412 and CHEM 4461 and CHEM 3411
Grade Mode(s): Standard Letter, Registrar do not use FN, Registrar do not use FS
CHEM 5121  Graduate Seminar  1 Credit  
Department: College of Arts and Sciences  
Offered: Spring  
Restriction(s):  
Undergraduate level students may not enroll.  

Grade Mode(s): Standard Letter, Registrar do not use FN, Registrar do not use FS, Satisfactory/Unsatisfactory  

CHEM 5201  Special Topics  2 Credits  
Department: College of Arts and Sciences  
Offered: Other  
Restriction(s):  
Undergraduate level students may not enroll.  

Grade Mode(s): Standard Letter, Registrar do not use FN, Registrar do not use FS  

CHEM 5301  Special Topics  3 Credits  
Department: College of Arts and Sciences  
The course is designed to meet special needs of students. Each topic is offered on an irregular schedule as the demand requires.  
May be Repeated for a maximum of 24 hours  
Restriction(s):  
Undergraduate level students may not enroll.  

Grade Mode(s): Standard Letter, Registrar do not use FN, Registrar do not use FS, Satisfactory/Unsatisfactory  

CHEM 5310  Advanced Analytical  3 Credits  
Department: College of Arts and Sciences  
Prerequisite: Graduate standing or consent of instructor  
Offered: Other  
Restriction(s):  
Enrollment limited to students with a class of Graduate.  
Undergraduate level students may not enroll.  

Grade Mode(s): Standard Letter, Registrar do not use FN, Registrar do not use FS  

CHEM 5315  Advanced Biophysical Chemistry  3 Credits  
Department: College of Arts and Sciences  
Graduate-level survey of the most important aspects of the structure and physical properties of molecules of biological importance. Includes discussions on biomacromolecule stability, thermodynamics, steady state, enzyme kinetics and inhibition and evaluation of the structure-property relationship using spectrometry and computational methods.  
Restriction(s):  
Undergraduate level students may not enroll.  

Grade Mode(s): Standard Letter, Registrar do not use FN, Registrar do not use FS  

CHEM 5330  Advanced Inorganic  3 Credits  
Department: College of Arts and Sciences  
Prerequisite: Graduate standing or consent of instructor  
Offered: Other  
Restriction(s):  
Enrollment limited to students with a class of Graduate.  
Undergraduate level students may not enroll.  

Grade Mode(s): Standard Letter, Registrar do not use FN, Registrar do not use FS  

CHEM 5350  Advanced Organic  3 Credits  
Department: College of Arts and Sciences  
Prerequisite: Graduate standing or consent of instructor  
Offered: Other  
Restriction(s):  
Enrollment limited to students with a class of Graduate.  
Undergraduate level students may not enroll.  

Grade Mode(s): Standard Letter, Registrar do not use FN, Registrar do not use FS  

CHEM 5361  Chemical Instrumentation  3 Credits  
Department: College of Arts and Sciences  
Graduate-level overview of chemical instrumentation. Includes theory, components, basic maintenance, analysis of results and development of analytical methods.  
Restriction(s):  
Undergraduate level students may not enroll.  

Grade Mode(s): Standard Letter, Registrar do not use FN, Registrar do not use FS
CHEM 5370  Advanced Physical  3 Credits
Department: College of Arts and Sciences
Prerequisite: Graduate standing or consent of instructor Offered: Other
Restriction(s):
Enrollment limited to students with a class of Graduate.
Undergraduate level students may not enroll.

Grade Mode(s): Standard Letter, Registrar do not use FN, Registrar do not use FS

CHEM 5377  Modern Laboratory Practices  3 Credits
Department: College of Arts and Sciences
Graduate-level course centered on the laboratory techniques and instrumentation encountered in industry and graduate laboratories. Attention is paid to the details leading to accuracy, precision and reproducibility.
Restriction(s):
Undergraduate level students may not enroll.

Grade Mode(s): Standard Letter, Registrar do not use FN, Registrar do not use FS

CHEM 5381  Scientific Communications  3 Credits
Department: College of Arts and Sciences
Overview of the fundamental aspects of scientific communication with a strong emphasis on Chemistry & Biochemistry. Students will be required to actively participate in advanced chemical literature searches, oral presentations and scientific writing.
Restriction(s):
Undergraduate level students may not enroll.

Grade Mode(s): Standard Letter, Registrar do not use FN, Registrar

CHEM 5388  Materials Chemistry  3 Credits
Department: College of Arts and Sciences
This course is designed for graduate-level students and covers three major types of materials being metal, ceramic and soft materials (i.e. polymer-based materials), with a focus on the role of chemistry in materials invention/discovery, advancement and recycling (end of life). Model chemicals are used to illustrate the typical life cycle of a materials product.
Restriction(s):
Undergraduate level students may not enroll.

Grade Mode(s): Standard Letter, Registrar do not use FN, Registrar do not use FS

CHEM 5390  Thesis  3 Credits
Department: College of Arts and Sciences
Must complete both CHEM 5390 and 5391 for required 6 credits.
May be Repeated for a maximum of 9 hours
Restriction(s):
Undergraduate level students may not enroll.

Grade Mode(s): Satisfactory/Unsatisfactory, Registrar do not use FN, Registrar do not use FS, Thesis/Dissertation

CHEM 5391  Thesis  3 Credits
Department: College of Arts and Sciences
Must complete both CHEM 5390 and 5391 for required 6 credits.
May be Repeated for a maximum of 9 hours
Restriction(s):
Undergraduate level students may not enroll.

Grade Mode(s): Satisfactory/Unsatisfactory, Registrar do not use FN, Registrar do not use FS, Thesis/Dissertation

CHEM 5399  Advanced Forensic Chemistry  3 Credits
Department: College of Arts and Sciences
A graduate-level overview of the qualitative and quantitative analysis of molecules-related forensic science. Topics include separation, analysis, comparison and discussions on current methods.
Restriction(s):
Undergraduate level students may not enroll.

Grade Mode(s): Standard Letter, Registrar do not use FN, Registrar do not use FS

CHEM 5401  Special Topics  4 Credits
Department: College of Arts and Sciences
Offered: Other
May be Repeated for a maximum of 12 hours
Restriction(s):
Undergraduate level students may not enroll.

Grade Mode(s): Standard Letter, Registrar do not use FN, Registrar do not use FS