CHMY 102CS. Applying Chemistry to Society. 3 Credits. (3 Lec) S
An introduction to contemporary chemistry in the contextual framework of current issues including the effect of human impact on the air, water, and earth. This course will examine the scientific basis for current scientific and societal issues such as depletion of the ozone layer, water pollution, acid rain, genetic engineering and nuclear fission among other issues. Topics will be addressed from a scientific viewpoint to develop knowledge and understanding of the chemical concepts that underlie these contemporary issues. The goal is to inform non-science majors of chemical and scientific issues in order to help them to become well-informed, inquiring citizens.

CHMY 121IN. Introduction to General Chemistry. 4 Credits. (2 Lec, 1 Lab, 1 Ret) F,S,Su
PREREQUISITE: C- or above in M 096 or M 097 or placement in a Math Level 3 via MPLEX/ACT/SAT (ACT 23 or SAT 540). Introductory general chemistry covering measurement systems, atomic structure, chemical periodicity, bonding, chemical reactions, acid-base chemistry, electrochemistry, and nuclear chemistry. Common hour exams.

CHMY 123. Introduction to Organic Chemistry and Biochemistry. 4 Credits. (2 Lec, 1 Lab, 1 Rec) F,S,Su
PREREQUISITE: C- or above in CHMY 121IN or CHMY 143. An introduction into functional group organic chemistry and reactivity, and important biochemical structures, concepts, and processes. The laboratory is closely integrated with lecture coverage.

CHMY 141. College Chemistry I. 4 Credits. (3 Lec, 1 Lab) F,S,Su
PREREQUISITE: C- or above in M 121Q or placement in a Math Level 4 (ACT 25 or SAT 580). The first of a two-semester course sequence about the general principles of modern chemistry with emphasis on atomic structure, chemical bonding, the periodic table, equilibrium, chemical reactivity, and kinetics. It is recommended that students registering for this course have taken high school chemistry. Common hour exams.

CHMY 143. College Chemistry II. 4 Credits. (3 Lec, 1 Lab) F,S,Su
PREREQUISITE: C- or above in CHMY 141 or CHMY 151. The second semester of the two-semester general chemistry sequence. Topics covered during this semester include properties of solutions, chemical kinetics, aequous equilibria, thermodynamics, and electrochemistry. Common hour exams.

CHMY 151. Honors College Chemistry I. 4 Credits. (3 Lec, 1 Lab) F
PREREQUISITE: Placement in a level 5 Math (Math ACT score of 27 or SAT of 620). Recommended that students registering for this course either have taken calculus or are concurrently enrolled. Also recommended that students registering in this course have taken high school chemistry and/or physics, preferably AP Chemistry and/or Physics. Topic coverage parallels CHMY 141, with emphasis on critical and analytical thought and with a greater reliance on math skills.

CHMY 153. Honors College Chemistry II. 4 Credits. (3 Lec, 1 Lab) S
PREREQUISITE: A grade better than a C in CHMY 141 or CHMY 151. Topic coverage parallels CHMY 143, with emphasis on critical and analytical thought and with a greater reliance on math skills.

CHMY 194. Seminar/Workshop. 1 Credit. (1 Sem) F
For the new student. Integration into the department and campus community. Scientific communication and chemical literature searching skills. Cross-listed with BCH 194.

CHMY 211. Elements of Organic Chemistry. 5 Credits. (4 Lec, 1 Lab) F,S
PREREQUISITE: C- or above in CHMY 121IN, CHMY 143, or CHMY 153.
A one-semester introduction to organic chemistry that covers all of the major topics of organic chemistry, but not in the same depth as the two-semester course. Topics include bonding, three-dimensional structure, nomenclature, isomers and spectroscopy (IR and NMR) as well as the reactivity of alkenes, alkynes, alkyl halides, amines, alcohols, ethers, amines, aldehydes, ketones, carboxylic acids and carboxylic acid derivatives.

CHMY 290R. Undergraduate Research. 1-6 Credits. (1-6 Ind; max unlimited) F,S
Directed undergraduate research/creative activity which may culminate in a written work or other creative project. Course will address responsible conduct of research. May be repeated.

CHMY 291. Special Topics/Expmtl Crse. 1-4 Credits. (1-4 Sem; 12 cr max) On Demand
Max 12 cr. PREREQUISITE: None required, but some may be determined necessary by each offering department. Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

CHMY 292. Independent Study. 1-3 Credits. (1-3 Ind; 6 cr max) On Demand
Max 6 cr. PREREQUISITE: Consent of instructor and approval of department head. Directed research and study on an individual basis.

CHMY 294. Seminar/Workshop. 1 Credit. (1 Sem) S
PREREQUISITE: CHMY 194 or BCH 194. Introduces students to faculty research and departmental research facilities with the goal of assisting students in the process of joining a research group. Issues related to becoming engaged in research including how to keep a research notebook, lab safety, ethics, etc. are also considered. Cross-listed with BCH 294.

CHMY 311. Fundamental Analytical Chemistry. 4 Credits. (3 Lec, 1 Lab) F,S,Su
PREREQUISITE: CHMY 143 or CHMY 153. Introduction to wet analytical chemistry with an emphasis on theory and applications of data statistics, the systematic treatment of equilibria, acid-base chemistry, redox equilibria, complexometric equilibria, titrations, Beer’s law, and chromatography. In addition, critical quantitative lab experiments will enhance practical lab skills.

CHMY 321. Organic Chemistry I. 4 Credits. (3 Lec, 1 Lab) F,S,Su
PREREQUISITE: CHMY 143 or CHMY 153. The first of a two-semester professional sequence in organic chemistry. Topics include in-depth coverage of conformational analysis, stereochemistry, acid-base chemistry, nomenclature and reactivity of and reactions mechanism for organic compounds including radical reactions of alkanes and the reactivity of alkyl halides, alkenes and alkynes.

CHMY 323. Organic Chemistry II. 4 Credits. (3 Lec, 1 Lab) F,S,Su
PREREQUISITE: CHMY 321. The second semester of the two-semester professional sequence in organic chemistry. Topics include the characterization of organic compounds by Mass Spectrometry as well as IR and NMR spectroscopy. Reactions, including mechanisms, of alcohols, ethers, amines, amines, aldehydes, ketones, enolates, carboxylic acids and carboxylic acid derivatives are covered in depth.

CHMY 331. Honors Organic Chemistry I. 4 Credits. (3 Lec, 1 Lab) F
PREREQUISITE: CHMY 151 and CHMY 153 or consent of instructor.
CHMY 331 is the first of a two-semester honors sequence in organic chemistry. Topic coverage parallels CHMY 321, but at an accelerated pace with in-depth coverage of physical organic chemistry, stereochemistry, synthetic organic chemistry, spectroscopy, and nomenclature.

CHMY 333. Honors Organic Chemistry II. 4 Credits. (3 Lec, 1 Lab) S
PREREQUISITE: A grade of better than a C in CHMY 331 or consent of instructor.
CHMY 333 is the second semester of the two-semester honors sequence in organic chemistry. Topic coverage parallels CHMY 323, with more in-depth coverage of mechanisms and more emphasis on retrosynthetic analysis and on solving multi step synthesis problems.

CHMY 340. Environmental Chemistry. 3 Credits.

CHMY 350. Astrobiology. 3 Credits. (3 Lec) F
PREREQUISITE: BIOE 170IN, CHMY 121IN, and ASTR 110IN (or equivalent) and junior standing. This course examines the science of Astrobiology focused on the origin, evolution, and distribution of life in the universe. Topics that will be discussed include planetary evolution, origin of life, habitability, evolution, intelligence, and the search for life beyond Earth.

CHMY 361. Elements of Physical Chemistry. 4 Credits. (4 Lec) F
PREREQUISITE: M 161Q or M 172Q and PHSX 207, and CHMY 211 or CHMY 323 or CHMY 333. A physical chemistry course directed toward the life sciences, health professions, and agricultural sciences.

CHMY 362. Elements of Physical Chemistry Lab. 1 Credit. (1 Lab) F
PREREQUISITE: CHMY 361 can be a prerequisite or co-requisite. The laboratory to accompany CHMY 361.

CHMY 371. Physical Chemistry-Quantum Chemistry and Spectroscopy I. 3 Credits. (3 Lec) F
PREREQUISITE: CHMY 143 or CHMY 153 and M 172Q and PHSX 222.
COREQUISITE: M 273Q. The first semester of a two-course sequence for science and engineering majors on quantum chemistry, statistical thermodynamics, spectroscopy, classical thermodynamics and kinetics.

CHMY 372. Physical Chemistry Laboratory I. 1 Credit. (1 Lab) F
COREQUISITE: CHMY 371 Laboratory to accompany CHMY 371. Fundamental experiments in thermodynamics and kinetics.
CHMY 373. Physical Chemistry - Kinetics and Thermodynamics. 3 Credits. (3 Lec) S
The second semester of a two-course physical chemistry sequence for science/ engineering majors. Students should take both semesters of the sequence.

CHMY 374. Physical Chemistry Lab II, 2 Credits. (2 Lab) PREREQUISITE: CHMY 371. COREQUISITE: CHMY 373. The advanced laboratory to accompany CHMY 373. In-depth experiments and data analysis. Required of all chemistry majors who take CHMY 373. While required for the Professional Option, CHMY 372 is not required as a prerequisite for CHMY 374.

CHMY 394. Seminar/Workshop. 1 Credit. (1 Sem) F PREREQUISITE: CHMY 294 or BCH 294. Developing student presentation skills thru the preparation and presentation of a group 50-minute talk on a chemical topic of current interest. Career planning and resume preparation. May be repeated once. Cross-Listed with BCH 394.

CHMY 401. Advanced Inorganic Chemistry. 3 Credits. (3 Lec) S COREQUISITE: CHMY 361 or CHMY 373. A systematic presentation of atomic structure and chemical bonding with emphasis on properties, structure, and the reactions of representative members of the various families of the periodic table.

CHMY 417. Synthetic Chemistry. 3 Credits. (3 Lec) F alternate years, to be offered odd years. PREREQUISITE: CHMY 323. Organic and inorganic reaction chemistry for advanced students. Modern reagents and transformations are treated in detail, along with relevant theoretical and mechanistic considerations.

CHMY 421. Advanced Instrument Analysis. 3 Credits. (2 Lec, 1 Lab) S Alternate Odd Years PREREQUISITE: CHMY 311 and CHMY 361 or CHMY 371. An advanced analytical chemistry course which covers modern instrumental methods based on spectro Chemical and electrochemical principles.

CHMY 490R. Undergraduate Research. 1-6 Credits. (1 Ind; 12 cr max) F,S,Su Max 12 cr. PREREQUISITE: Consent of instructor. Directed undergraduate research/creative activity which may culminate in a research paper, journal article, or undergraduate thesis. Course will address responsible conduct of research. May be repeated.

CHMY 491. Special Topics/Expmtl Course. 1-4 Credits. (1-4 Lec; 12 cr max) On Demand Max 12 cr. PREREQUISITE: Course prerequisites as determined for each offering. Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

CHMY 492. Independent Study. 1-4 Credits. (1-4 Ind; 6 cr max) On Demand Max 6 cr. PREREQUISITE: Junior standing, consent of instructor, and approval of department head. Directed research and study on an individual basis.

CHMY 494. Seminar/Workshop. 1 Credit. (1 Sem) S PREREQUISITE or COREQUISITE: CHMY 394 or BCH 394. Senior capstone course. Taught in collaboration with departmental Honors Thesis. CHMY 499. The chemistry/biochemistry research undergraduate experience constitutes a synthesis of our (bio)chemistry class room and laboratory education. The projects are orally presented in seminar form, discussed on the basis of acquired knowledge, and analyzed using stringent scientific methods and criteria. A complete personal resume is prepared. May be repeated once. Cross-listed with BCH 494.

CHMY 499. Senior Thesis/Capstone. 1 Credit. (1 Lec) S PREREQUISITE: CHMY 490R or BCH 490R (minimum of 3 cr). Thesis format and style will be illustrated, discussed, and monitored. Draft portions of manuscripts are to be completed on a regular schedule. Required of all candidates for departmental honors. Cross-listed with BCH 499.

CHMY 501. Advanced Inorganic Chemistry. 3 Credits. (3 Lec.) F A systematic presentation of atomic structure and chemical bonding with emphasis on properties, structure, and the reactions of representative members of the various families of the periodic table.

CHMY 505. Critical Concepts in Chemistry, 3 Credits. (2 Lec, 1 Lab) Su PREREQUISITE: CHMY 121N or equivalent. Course explores new learning strategies that encourage discovery-based learning. Class will explore ways to use computer technology to engage students in discovery-based learning.
CHMY 551. Organic Structure Elucidation. 3 Credits. (3 Lec) S alternate years, to be offered every year. PREREQUISITE: CHMY 417. Spectroscopic structure elucidation of small organic molecules. Techniques to be discussed include 1-D and 2-D NMR spectroscopy, UV, IR, MS, and Raman spectroscopies. Emphasis will be on interpreting spectra to deduce the structure of the compound in question.

CHMY 554. Organometallic Chemistry. 3 Credits. (3 Lec) S alternate years, to be offered every year. PREREQUISITE: CHMY 321, CHMY 323 and CHMY 553. Application of organometallic chemistry to organic transformations.

CHMY 557. Quantum Mechanics. 3 Credits. (3 Lec) F alternate years, to be offered every year. PREREQUISITE: CHMY 373 or equivalent. Applications of quantum mechanics to molecules and spin systems.

CHMY 558. Classical & Stat Thermodynamic. 3 Credits. (3 Lec) F alternate years, to be offered odd years. PREREQUISITE: CHMY 373 or equivalent. Classical & statistical thermodynamics applied to chemical systems.

CHMY 559. Kinetics & Dynamics. 3 Credits. (3 Lec) S alternate years, to be offered every year. PREREQUISITE: CHMY 373 or equivalent Chemical kinetics, theories of reaction rates, molecular reaction dynamics, with applications to Chemical reactions in the gas phase, on surfaces, and in solution.

CHMY 560. Symmetry, Orbitals, and Spectroscopy. 3 Credits. (3 Lec) F alternate years, to be offered odd years. PREREQUISITE: CHMY 373. Group theory with applications, semi-empirical and ab initio calculations, vibrational and electronic spectroscopy, and their interrelationship will be covered.

CHMY 564. Adv Quantum Chemistry. 3 Credits. (3 Lec) S alternate years, to be offered odd years. PREREQUISITE: CHMY 557 or equivalent. Time independent and time dependent quantum mechanics with application to chemical bonding and molecular spectroscopy.

CHMY 575. Professional Paper. 1-6 Credits. (1-6 Ind; 6 cr max) F.S Maximum 6 credits. PREREQUISITE: Consent of instructor. A research or professional paper or project dealing with a topic in the field. The topic must have been mutually agreed upon by the student and his or her major advisor and graduate committee. Cross-Listed with BCH 575.

CHMY 587. Exploring Chemistry for Teachers. 3 Credits. (3 Lec) Su PREREQUISITES: Teacher of science with a minimum of two years teaching experience. The course will lead to a greater understanding of chemical concepts, provide resources and ideas for class activities, and advise from fellow teachers with the ultimate goal of enhancing your teaching abilities—and giving you confidence in your understanding of the material. The level of content is appropriate for either a stand-alone class in high school or as a section in an integrated science class. Students of this course will gain insight to how topics in chemistry are linked together and how they can be all applied to explain other areas of science and topics of public concern.

CHMY 588. Professional Development. 1-3 Credits. (1-3 Lec; 3 cr max) On Demand Max 3 cr. PREREQUISITE: Graduate standing; teaching experience and/or current employment in a school or organization; and consent of instructor and Dean of Graduate Studies. Courses offered on a one-time basis to fulfill professional development needs of in-service educators. A specific focus is given to each course which is appropriately subtitled. May be repeated.

CHMY 589. Graduate Consultation. 1-3 Credits. (3 Ind) F,S,Su PREREQUISITE: Master's standing and approval of the Dean of Graduate Studies. This course may be used only by students who have completed all of their course work (and thesis, if on a thesis plan) but who need additional faculty or staff time or help.

CHMY 590. Master's Thesis. 1-10 Credits. (1-10 Ind; max unlimited) F,S,Su IND Maximum credits unlimited. PREREQUISITE: Master's standing.

CHMY 591. Special Topics. 1-4 Credits. (1-4 Lec; 12 cr max) On Demand PREREQUISITE: Upper division courses and others as determined for each offering. Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

CHMY 592. Independent Study. 1-3 Credits. (1-3 Ind; 3 cr max) On Demand Max 3 cr. PREREQUISITE: Graduate standing, consent of instructor, approval of department head and Dean of Graduate Studies. Directed research and study on an individual basis.

CHMY 593. Kinetics, Equilibrium & Thermodynamics for Teachers. 3 Credits. (2 Lec. 1 Rec) Sp PREREQUISITES: A minimum of 2 years teaching experience. Equilibrium, Thermodynamics, and Kinetics explain why reactions stop where they do, why they get hot or cold, and how fast they occur. This course is designed to help teachers of chemistry bolster their background in equilibrium, thermodynamics, and kinetics as well as provide assistance in the teaching of these topics. A classroom population represents a distribution of learning styles and a goal of this course is to provide a variety of instructional tools for teachers to utilize in their classrooms.

CHMY 594. Seminar. 1 Credit. (1 Sem.; 4 cr max) On Demand Max 4 cr. PREREQUISITE: Graduate standing or seniors by petition. Course prerequisites as determined for each offering. Topics offered at the graduate level which are not covered in regular courses. Students participate in preparing and presenting discussion material. Cross-Listed with BCH 594.

CHMY 595. Chemistry of the Environment for Teachers. 3 Credits. (2 Lec. 1 Lab) Su PREREQUISITES: Teacher of science with 2 years minimum teaching experience and undergraduate chemistry course. This course is designed to familiarize existing secondary teacher (ideally 8th and 9th grade) with basic general science and chemistry concepts of the environment, including water, air and Earth - as well as to provide opportunities to enrich these chemistry concepts through applications and examples. Since this course will be building upon basic chemistry concepts, teachers taking this course should have taken general chemistry at the undergraduate level, or the equivalent.

CHMY 596. Exploring Organic Chemistry for Teachers. 3 Credits. (1 Lec. 1 Lab. 1 Rec) F PREREQUISITES: CHMY 599 Atoms First-Primer for AP/IB Chemistry Teachers & CHMY 593 Kinetics, Equilibrium, Thermodynamics for Teachers. College level, or the equivalent at the sophomore level is highly recommended. This course is for teachers of science interested in refreshing and/or increasing organic chemistry knowledge for application in the high school classroom. Weekly discussion topics cover course content and teaching aids specific to organic chemistry. Exams include a Teaching Organic Chemistry Problem. An optional teaching project resulting in an organic chemistry unit of study is available.

CHMY 597. Exploring Biochemistry I for Teachers. 3 Credits. (3 Lec) Su Alternate Odd Years PREREQUISITES: Teacher of science with a minimum of 2 years teaching experience. Background in general chemistry, organic chemistry, and biology. The course will consider the reactions of the principle biochemical molecules (carbohydrates, lipids, proteins, and nucleic acids) with additional emphasis on biomedical topics. The primary goal of this course is to promote critical thinking about important, current health issues and to examine the role of laboratory modules in teaching these concepts. General biochemistry principles will be presented to understand the diseases under review. Written material will be provided on advanced topics.

CHMY 598. Exploring Biochemistry: Metabolism for Teachers. 3 Credits. (2 Lec. 1 Lab) Su Alternate Even Years PREREQUISITES: Teacher of science with a minimum of two years teaching experience. Background in general chemistry, organic chemistry, and biology. This course is designed to serve as the second semester of a two-semester sequence of biochemical principles. The course will build on topics covered in CHMY 597 (Exploring Biochemistry I for Teachers) such as carbohydrates, lipids, proteins and nucleic acids. The proposed course will investigate the metabolism of each of these biochemical molecules while exploring applications of these topics to a classroom setting. The textbook will be used as a basis for the course but students will be required to utilize materials from various resources including chapter summaries, related internet websites, scientific journals, and material compiled on the students part.

CHMY 599. An Atoms-First Primer for AP/IB Chemistry Teachers. 3 Credits. (1 Lec. 1 Lab. 1 Rec) F PREREQUISITES: A minimum of two teachers teaching high school chemistry. The course is specific to teachers of Advanced Placement (AP) and/or International Baccalaureate (IB) chemistry. This course is designed to introduce teachers of Advanced Placement (AP) or International Baccalaureate (IB) Chemistry courses to an Atoms-First pedagogy in the teaching of their courses. Students will be exposed to the an Atoms First approach to teaching AP or IB chemistry which emphasizes a pedagogy of building chemical foundations before moving onto more difficult topics. Students will finish by developing lesson plans using this pedagogy to teach AP or IB chemistry at the high school level.
CHMY 689. Grad Research/Instruction. 1-3 Credits. (1-3 Lec; 3 cr max) F,S,Su
PREREQUISITE: Graduate standing. COREQUISITE: CHMY 590 or CHMY 690.
Classroom instruction associated with directed graduate research/creative activity
projects.

CHMY 690. Doctoral Thesis. 1-10 Credits. (1-10 Ind; max unlimited) F,S,Su
PREREQUISITE: Doctoral standing.
Font Notice

This document should contain certain fonts with restrictive licenses. For this draft, substitutions were made using less legally restrictive fonts. Specifically:

Times was used instead of Adobe Garamond Pro.

The editor may contact Leepfrog for a draft with the correct fonts in place.