

# CHEMISTRY (CHEM)

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## **CHEM 105. Introduction to Chemistry. 1 Credit.**

**Offered Either Fall or Spring, TLC Tutoring Course; Lecture hours:3, Lab:3**

A terminal elementary course covering in-depth selected topics, which may vary from year to year. Satisfies science requirement for Bachelor of Arts students not majoring in science or engineering. Not open to students who have taken CHEM 160 or any 200-level CHEM course. Prerequisite: seniors by permission only.

## **CHEM 107. Chemistry of Cooking. 1 Credit.**

**Offered Summer Session Only; Lecture hours:4, Other:3**

This course will introduce students to the fundamental principles of chemistry in the context of cooking and food preparation. Students will analyze and solve food-related questions using chemistry concepts, create their own recipes by understanding the scientific interactions between ingredients and cooking methods and gain appreciation for the science behind cooking.

## **CHEM 131. What's That Smell?. 1 Credit.**

**Offered Occasionally; Lecture hours:3, Lab:3**

Our sense of smell is an exquisite chemical detector that guides us to delicious foods, away from potential threats, and triggers memories of lived experiences. This course explores the many sources of smells in our environment, how we detect smelly chemicals, and how scents can be grouped using chemical thinking.

## **CHEM 203. General Chemistry for Engineers. 1 Credit.**

**Offered Fall Semester Only, TLC Tutoring Course; Lecture hours:3, Other:4**

Fundamental principles in inorganic chemistry including aqueous reactions, atomic and molecular structure, coordination compounds, solids, liquids, and gases, and basic equilibrium. Laboratory experiments are both qualitative and quantitative.

## **CHEM 205. Principles of Chemistry. 1 Credit.**

**Offered Both Fall and Spring, TLC Tutoring Course; Lecture hours:3, Other:4**

First college chemistry course for most students. Introduction to chemical principles. Prerequisite: high school chemistry or equivalent. Credit not given for both CHEM 205 and CHEM 207.

## **CHEM 207. Explorations in Chemistry. 1 Credit.**

**Offered Occasionally; Lecture hours:3, Lab:5**

Advanced introductory chemistry course for students with a strong chemistry background. Inquiry based projects and lab experiences. Students seeking permission to take CHEM 207 (instead of CHEM 205) must take the online placement test. Credit not given for both CHEM 207 and CHEM 205.

## **CHEM 211. Organic Chemistry I. 1 Credit.**

**Offered Both Fall and Spring, TLC Tutoring Course; Lecture hours:3, Other:4**

First-year, second-semester course for students majoring in chemistry, biochemistry, and biology. Bonding and structure in organic compounds, resonance, organic acid/base reactions, basic nomenclature, conformational analysis, stereochemistry, properties and reactions of functional groups. Prerequisite: CHEM 203 or CHEM 205 or CHEM 207 or permission of instructor.

## **CHEM 212. Organic Chemistry II. 1 Credit.**

**Offered Both Fall and Spring, TLC Tutoring Course; Lecture hours:3, Other:4**

A continuation of CHEM 211 with focus on properties and reactions of functional groups, synthesis, and spectroscopic analysis. Prerequisite: CHEM 211.

## **CHEM 230. Principles of Chemistry 2. 1 Credit.**

**TLC Tutoring Course, Offered Spring Semester Only; Lecture hours:3, Other:4**

Quantitative topics in equilibrium, acid-base chemistry, solubility, and electrochemistry, solid state crystal structures, coordination complexes, and nuclear chemistry are introduced. Especially appropriate for life-science students. Prerequisite: CHEM 203, or CHEM 205, or CHEM 207. Students may take only one of these for credit: CHEM 230, CHEM 231, or CHEM 233.

## **CHEM 231. Quantitative Analysis. 1 Credit.**

**TLC Tutoring Course, Offered Spring Semester Only; Lecture hours:3, Other:5**

Chemical equilibrium and modern analysis with an emphasis on acid-base systems, solubility, metal ion determinations, electroanalytical chemistry, spectrophotometry, and separation methods. Prerequisite: CHEM 203, or CHEM 205 or CHEM 207. Students may take only one of the following courses for credit: CHEM 230, CHEM 231 or CHEM 233.

## **CHEM 233. Analytical Chemistry for Engineers. 1 Credit.**

**Offered Fall Semester Only; Lecture hours:3, Other:4**

Chemical equilibrium and modern analysis with an emphasis on acid-base systems, solubility, metal ion determinations, electroanalytical chemistry, and spectrophotometry. College of Engineering students only. Prerequisite: CHEM 205 or CHEM 207, or by instructor permission. Students may take only one of these for credit: CHEM 230, CHEM 231, or CHEM 233.

## **CHEM 2NT. Chemistry Non-traditional Study. 1-2 Credits.**

**Offered Fall, Spring, Summer; Lecture hours:Varies, Other:Varies**

Non-traditional study in chemistry. Prerequisite: permission of the instructor.

**CHEM 313. Synthetic Organic Chemistry. 1 Credit.****Offered Occasionally; Lecture hours:3,Recitation:1**

Modern synthetic organic chemistry, with examples involving complex natural products. Application of organic mechanism, synthetic strategy, and advanced transformations to total synthesis. Prerequisite: CHEM 212. Crosslisted as CHEM 613.

**CHEM 314. Mechanistic Organic Chemistry. 1 Credit.****Offered Occasionally; Lecture hours:4**

Thermal and kinetic aspects of organic reactions are discussed along with the effect of substituents, solvents, and stereochemistry on reaction pathways. Qualitative molecular orbital theory of organic compounds is covered in depth. Weekly problem sessions are held. Prerequisite: CHEM 212. Crosslisted as CHEM 614.

**CHEM 317. Special Topics in Organic Chemistry. 1 Credit.****Offered Occasionally; Lecture hours:4; Repeatable**

Topics vary. Prerequisite: CHEM 212 or permission of the instructor. Crosslisted as CHEM 617.

**CHEM 321. Inorganic Chemistry I. 1 Credit.****Offered Fall Semester Only; Lecture hours:3,Other:5**

Structures and reactivity of inorganic systems. Emphasizes hands-on, experiential learning in workshops and laboratory. Prerequisites: CHEM 211 and CHEM 231 or permission of the instructor. Crosslisted as CHEM 621.

**CHEM 322. Inorganic Chemistry II. 1 Credit.****Offered Spring Semester Only; Lecture hours:3,Other:5**

Survey course in modern inorganic chemistry covering transition metal, coordination, organometallic, and bioinorganic chemistry. Laboratory will consist of synthetic and physical measurements as well as the manipulation of air sensitive materials. Prerequisite: CHEM 321 or permission of the instructor. Crosslisted as CHEM 622.

**CHEM 327. Special Topics in Inorganic Chemistry. 1 Credit.****Offered Occasionally; Lecture hours:4; Repeatable**

Topics vary. Prerequisite: CHEM 321 or permission of the instructor. Crosslisted as CHEM 627.

**CHEM 332. Instrumental Analysis. 1 Credit.****Offered Fall Semester Only; Lecture hours:3,Other:5**

Theory and practice of techniques of instrumental analysis including spectrophotometry, fluorescence, mass spectrometry, atomic absorption, chromatography, capillary electrophoresis and dynamic electrochemistry. Prerequisite: CHEM 231. Crosslisted as CHEM 632.

**CHEM 337. Special Topics in Analytical Chemistry. 1 Credit.****Offered Occasionally; Lecture hours:4**

Topics vary. Prerequisite: CHEM 231 or permission of the instructor. Crosslisted as CHEM 637.

**CHEM 340. Biological Physical Chemistry. 1 Credit.****Offered Spring Semester Only; Lecture hours:3,Other:6**

Introduction to physical chemistry for life science students, with emphasis on thermodynamics, hydrodynamics and spectroscopy. Not open to B.S. chemistry majors. Prerequisites: CHEM 231, MATH 201, and PHYS 211P. MATH 202 and PHYS 212 are recommended. Crosslisted as CHEM 640.

**CHEM 341. Physical Chemistry I. 1 Credit.****Offered Fall Semester Only; Lecture hours:3,Other:5**

Survey of physical chemistry including introductory thermodynamics, quantum mechanics, spectroscopy, kinetics, and statistical mechanics. Prerequisites: CHEM 231, MATH 211, and PHYS 212. Crosslisted as CHEM 641.

**CHEM 342. Physical Chemistry II. 1 Credit.****Offered Spring Semester Only; Lecture hours:3,Other:5**

Introductory physical chemistry with emphasis on quantum mechanics, structure and bonding, molecular spectroscopy and statistical mechanics. The customized laboratory experience will emphasize applications of spectroscopy and computational methods. Prerequisite: CHEM 341. Crosslisted as CHEM 642.

**CHEM 343. Physical Chemistry for Engineers. 1 Credit.****Offered Fall Semester Only; Lecture hours:3,Recitation:1**

Introductory physical chemistry for engineers, with emphasis on thermodynamics, chemical kinetics and electrochemistry. Prerequisites: CHEM 231 or CHEM 233, MATH 211, PHYS 211. Only open to engineering majors.

**CHEM 347. Special Topics in Physical Chemistry. 1 Credit.****Offered Occasionally; Lecture hours:4**

Topics vary. Prerequisite: CHEM 230 or CHEM 231 or permission of the instructor. Crosslisted as CHEM 647.

**CHEM 351. Biochemistry I. 1 Credit.****Offered Fall Semester Only; Lecture hours:3,Recitation:1**

Introduction to biological chemistry with emphasis on the structure and function of proteins, lipids, carbohydrates and nucleic acids, kinetics and mechanisms of enzymes, bioenergetics, and metabolism. Prerequisites: CHEM 212 and either CHEM 230 or CHEM 231. Crosslisted as CHEM 651.

**CHEM 352. Biochemistry II. 1 Credit.****Offered Spring Semester Only; Lecture hours:3,Recitation:1**

Advanced topics in protein structure and function, protein folding, enzyme mechanisms, electron transport and free-energy coupling mechanisms, biosynthesis, metabolic regulation, and supramolecular assemblies. Prerequisite: CHEM 351 or permission of the instructor. Crosslisted as CHEM 652.

**CHEM 357. Special Topics In Biochemistry. 1 Credit.****Offered Occasionally; Lecture hours:3,Other:1**

Structure/function relationships and dynamics of biomolecules. Prerequisite: permission of the instructor. Crosslisted as CHEM 657.

**CHEM 358. Biochemical Methods. 1 Credit.****Offered Spring Semester Only; Lecture hours:2,Other:6**

A course in laboratory techniques including cell fractionation, protein, and nucleic acid analysis. Spectrophotometry, chromatography, centrifugation, electrophoresis, and mass spectrometry are emphasized. Prerequisites: BIOL 203 and BIOL 204 and CHEM 351 and permission of the instructor. Crosslisted as BIOL 340.

**CHEM 360. Advanced Environmental Chemistry. 1 Credit.****Offered Alternate Fall or Spring; Lecture hours:4**

Chemistry of the atmosphere, hydrosphere, and lithosphere. Natural processes and anthropogenic effects will be discussed. Prerequisite: CHEM 230 or CHEM 231 or permission of the instructor. Crosslisted as CHEM 660.

**CHEM 365. Atmospheric Chemistry and Physics. 1 Credit.****Offered Either Fall or Spring; Lecture hours:4**

Addresses the relationships of chemistry, physics, and engineering principles in understanding processes in the Earth's atmosphere. Topics include overview of the Earth's atmospheric history and problems of current environmental concerns including urban ozone, acid rain, particulate pollution, and global change. Crosslisted as CHEG 455 and CHEG 655.

**CHEM 375. Undergraduate Research. .5-2 Credits.****Offered Both Fall and Spring; Lecture hours:Varies,Other:Varies; Repeatable**

Original investigations in analytical, biological, organic, physical, environmental or inorganic chemistry.

**CHEM 376. Undergraduate Research. .5-2 Credits.****Offered Both Fall and Spring; Lecture hours:Varies,Other:Varies; Repeatable**

Original investigations in analytical, biological, organic, physical, environmental or inorganic chemistry.

**CHEM 385. Seminar. .5 Credits.****Offered Fall Semester Only; Lecture hours:2; Repeatable**

Topics vary. Crosslisted as CHEM 685.

**CHEM 386. Seminar. .5 Credits.****Offered Spring Semester Only; Lecture hours:2; Repeatable**

Topics vary. Crosslisted as CHEM 686.