

BADM 481 Senior Capstone: Business Strategy & Policy	(4, S)
Integrates social responsibility and ethics with instruction in the strategic planning process. Ethical core values act as guidelines for development of organizational plans. (Seniors only, except by permission.) Prerequisite: Spreadsheet Competency.	
BADM 191, 291, 391, 491 Independent Study	(1, 2, 3, or 4)
BADM 295, 395, 495 Special Topics	(1, 2, 3, or 4)
Group study of special topics.	
BADM 496 Honors in Business	(4, S)

Chemistry (majors and minor)

Department of Chemistry: Karen E. Torraca, chair. Keith A. Horn, Associate Dean

Faculty: Irmgard K. Howard, John M. Rowley, Karen E. Torraca

Emeritus Professor: Larry W. Christensen

Web site: www.houghton.edu/academics/programs/chemistry

Phone: 585.567.9280

Majoring in chemistry at Houghton College is a great way to prepare for a career in one of the health professions or for a career in chemistry! Our alumni include medical doctors (allopathic MD, osteopathic DO), optometry doctors (OD), podiatrists (DPM), chiropractic doctors (DC), medical missionaries, nurses, physicians' assistants, dentists, veterinarians, clinical chemists, medical technologists, physical therapists, and nutritionists. In addition, our graduates have become research chemists, forensic scientists, pharmaceutical researchers, medicinal chemists, environmental analysts, science writers, college professors, high-school teachers and technology managers and executives, among other professionals. Chemistry students interested in nursing have earned a Houghton undergraduate chemistry degree, and then entered an advanced accelerated nursing program to complete an additional degree in fewer than two more years. (For more information on the Pre-Health Professions, see that section of this catalog under "Biology Department.")

Major: BS (35 hours in the major; 8 in prerequisites; 20 in co-requisites)

The BS chemistry major is designed for preparation for professional employment or for graduate work in chemistry or chemically-related fields.

Prerequisites:

CHEM 151, 152 General Chemistry I, II 8

Co-requisites:

PHYS 151, 152 General Physics I, II 8
 MATH 181 Calculus I 4
 MATH 182 Calculus II 4
 MATH 241 Differential Equations 4

Required courses:

CHEM 241, 242 Organic Chemistry I, II 8
 CHEM 277 Analytical Chemistry 4
 CHEM 278 Chemical Instrumentation in Research 4
 CHEM 361, 362 Physical Chemistry I, II 8
 CHEM 286 Special Topics 2
 CHEM 482 Senior Capstone: Chemistry Seminar 1

Additional 8 hours in chemistry selected from courses numbered above 300, including at least one of the following courses:

CHEM 332 Biochemistry
 CHEM 343 Advanced Organic Chemistry
 CHEM 453 Advanced Inorganic Chemistry

Major: BA (27 hours in the major; 8 in prerequisites; 20 in co-requisites)

The BA chemistry major is designed for preparation for medical school (see Pre-Health Professions sections of this catalog under the Biology Department) or for teaching programs in secondary education.

Students interested in working toward certification to teach Chemistry at the middle and high school levels can do so by double-majoring in Chemistry and Adolescence Education (ADE). Please see the Education Department section of this catalog for details.

Prerequisites:

CHEM 151, 152 General Chemistry I, II.....8

Co-requisites:

PHYS 151, 152 General Physics I, II.....8

MATH 181 Calculus I.....4

MATH 182 Calculus II.....4

MATH 241 Differential Equations.....4

Required courses:

CHEM 241, 242 Organic Chemistry I, II.....8

CHEM 277 Analytical Chemistry.....4

CHEM 278 Chemical Instrumentation in Research.....4

CHEM 361, 362 Physical Chemistry I, II.....8

CHEM 286 Special Topics.....2

CHEM 482 Senior Capstone: Chemistry Seminar.....1

Minor: The minor in chemistry consists of any three four-hour CHEM courses (total of 12 hours) numbered in the 200-level or above.

[Biochemistry (CHEM 332) plus Bioanalytical Laboratory (CHEM 334), together, count as a four-hour course.]

COURSE DESCRIPTIONS

CHEM 113 Elements of Biochemistry (4, OD)

Forms and functions of chemicals in life. Fundamentals of inorganic, organic, and biological chemistry with contemporary applications. Also designed for pre-nursing students. Three lecture, three laboratory hours per week.

CHEM 121 Impact: Science on Society (3, S)

Interrelationships between science, modern society, and Christianity. Nature and limitations of science. Political and social decisions with a scientific component. In-depth analysis of several areas where science plays a critical role in contemporary life. 2nd Science.

CHEM 151 General Chemistry I (4, F)

Theories and principles of modern chemistry: stoichiometry, atomic theory and structure, bonding, properties of matter, descriptive chemistry of some important elements. Laboratory devoted to synthesis, analysis, and experiments based upon principles developed in lecture. Three lecture, three laboratory hours per week. Lab Science or 2nd Science.

CHEM 152 General Chemistry II (4, S)

Continuation of CHEM 151; description and control of chemical reactions (equilibrium, thermodynamics, kinetics, electrochemistry, coordination compounds, nuclear, and organic chemistry). Laboratory designed to illustrate principles developed in lecture. Three lecture, three laboratory hours per week.

CHEM 187 Introduction to Nutrition (3, F&S)

Digestion, metabolism, nutrition of normal individuals. Essentials of adequate diets and food sources of nutrients; nutritional comparison of food in relation to normal and modified diets. Does not count for major or minor credit. If taken with CHEM 188, meets lab science and Health & Wellness: Point 1. Without CHEM 188, 2nd Science and Health & Wellness: Point 1.

CHEM 188 Introduction to Nutrition Laboratory (1, F)

This laboratory is designed to parallel the structure of CHEM 187, demonstrating at a hands-on level the components, concepts, and stewardship of contemporary nutrition. Three lab hours per week. With CHEM 187, Lab Science.

CHEM 221 Contemporary Organic Chemistry (4, OD)
For pre-nursing, pre-medical technology, BA biology, and general science majors. Fundamentals of organic chemistry; emphasis on structure, reactions, properties of organic molecules. Three lecture, three laboratory hours per week. Prerequisite: CHEM 151 or CHEM 113.

CHEM 241, 242 Organic Chemistry (4/4, F/S)
Modern organic chemistry: relationships between organic molecular structure and chemical reactivity; mechanisms of molecular transformations; synthesis and spectroscopy. Three lecture, four laboratory hours per week. (CHEM 241 must precede 242.) Prerequisite: CHEM 152.

CHEM 277 Analytical Chemistry (4, F)
Principles of gravimetric, volumetric, and electroanalytical methods of analysis. Acid base, precipitation, complexometric, redox titrimetry. Quantitative methods based on absorption of radiation. Statistical treatment of data. Laboratory: analysis of unknown samples. Three lecture, four laboratory hours per week. Prerequisite: CHEM 152.

CHEM 278 Chemical Instrumentation in Research (4, S)
Instrumental methods of analysis. Principles and application of various types of spectroscopy (including UV-VIS, IR, NMR), atomic absorption and emission, mass spectrometry, thermal and electrochemical methods of analysis, etc. Three lecture, four laboratory hours per week. Prerequisite: CHEM 277.

CHEM 286 Special Topics in Chemistry (2, F)
An introduction to areas of chemistry not treated in other courses. Topics have included the following: medicinal, forensic, nutritional, environmental, and clinical chemistries. Consult the department for the topic offered in any given year. Prerequisite: CHEM 241.

CHEM 332 Biochemistry (3, S)
Structures, functions, and metabolic relationships of representative compounds involved in life processes; brief introduction to enzymology, inborn errors, regulation of metabolism, nutritional implications, clinical applications. Prerequisite: CHEM 221 or CHEM 241.

CHEM 334 Bioanalytical Laboratory (1, S)
The practice of analytical chemistry as applied to biochemical systems. Qualitative and quantitative laboratory experience in gravimetric, volumetric, potentiometric, and spectrometric techniques.

CHEM 343 Advanced Organic Chemistry (4, F)
Theoretical and physical organic chemistry. Interrelationship of structure and reactivity; dynamics of organic reactions; methods of synthesis; current topics of special importance to organic chemistry and introduction to current original publications in organic chemistry.

CHEM 352 Physical Principles of Chemistry (3, OD)
For students whose major interests lie in medicine, biology or secondary education. A one semester, less mathematically oriented, introduction to physical chemistry offering a core of concepts related to life-processes. Three lecture hours per week. Prerequisite: Chemistry 242.

CHEM 361, 362 Physical Chemistry (4/4, F/S)
Theoretical aspects of principles of chemistry: derivation and application, with emphasis on thermodynamics, kinetics, and molecular structure. Practical applications in laboratory. Three lecture, four laboratory hours per week. Prerequisites: PHYS 151, 152; CHEM 151; and either Prerequisite or Co-requisite: MATH 241 or MATH 321.

CHEM 393 Summer Collaborative Research in Chemistry (1, 2, 3, or 4, Summer/Mayterm)
Summer program of doing research in chemistry with a member of the chemistry faculty. Students work individually or together to explore the literature, perform analyses, design and perform syntheses, and report their results orally and in writing. Prerequisite: CHEM 152.

CHEM 453 Advanced Inorganic Chemistry (3, OD)
Theories of atomic and molecular structure, bonding; emphasis on organometallic chemistry; descriptive chemistry of the elements; current topics of special importance. Prerequisite: CHEM 277.

CHEM 480 General Science Seminar (1, S)

Written thesis and oral presentation on a topic selected for interdisciplinary breadth describing current scientific research in the area of the student's concentration, based on a thorough review of scientific literature.

CHEM 482 **Senior Capstone: Chemistry Seminar** (1, S)
Journal reports and discussion of recent developments in chemistry. Required of all chemistry majors.

CHEM 291, 292, 391, 392; 491, 492 **Research in Chemistry** (1-4, OD)

CHEM 496 **Honors in Chemistry** (4)
A special individual research project, completed in a chemistry-major's senior year, resulting in a publishable undergraduate thesis.

Christian Formation

(major, minors, and youth ministries concentration)

Department of Theology: Kristina LaCelle-Peterson, chair. W. Christopher Stewart, Associate Dean

Faculty: Jonathan Case, Richard K. Eckley, Kristina LaCelle-Peterson, Terence P. Paige, Paul W. Shea, Kulli Tõniste, J. Michael Walters

Web site: www.houghton.edu/academics/programs/religion-philosophy

Phone: 585.567.9460

Major: BS (49-54 hours)

The Christian Formation major, along with its youth ministries concentration, includes a strong liberal arts foundation plus theoretical and applied studies in religious education, to assist the student in preparing for church or parachurch vocations such as Christian education director, children, youth, or adult education director, or careers in denomination educational programs or publications. The department expects that majors will fully prepare themselves for the above vocations through subsequent graduate programs in a university or seminary. To be eligible for TAP, New York state residents must also declare a second major.

12-16 hours in Christian Formation:

CRFM 231 Foundations of Educational Ministry 2

4 hours chosen from:

CRFM 331 Christian Formation of Children 2

CRFM 332 Christian Formation of Youth 2

CRFM 333 Christian Formation of Adults 2

CRFM 442 Internship in Christian Formation 4-8

CRFM 482 Senior Capstone: Seminar in Christian Formation... 2

12 hours in Bible:

BIBL 221 Biblical Interpretation 4

Two Bible electives..... 8

6 hours in ministry:

MIN 210 Introduction to Christian Ministries..... 2

MIN 317 Leadership in the Church..... 4

4 hours in Bible Teaching Proficiencies:

CRFM 325 Bible Study and Teaching Methods..... 2

GREK 111 Fundamentals of Biblical Greek **or**

HEBR 111 Fundamentals of Biblical Hebrew..... 2

8 hours in theology

THEL 313 Systematic Theology..... 4

THEL 320 Spiritual Formation..... 4

4 hours in family studies chosen from:

THEL 337 Theological Foundations of the Family 4

PSY 426 Family Systems Theory 4

SOC 237 Introduction to Marriage & Family Studies..... 4

3-4 hours in urban ministry chosen from:

URMN 212 Urban Ministry 4

URMN 250 Evangelism & Social Action in the Urban Context ... 3