CHEMISTRY (ACS CERTIFIED)

The Bachelor of Science in Chemistry at the University of Michigan-Dearborn is fully accredited by the American Chemical Society (ACS). This program is designed primarily for students who intend to go into Chemistry as a profession or who plan to continue their studies at the graduate level. A student may earn a Bachelor of Science degree in chemistry by completing the prerequisite, major, and cognate courses and by fulfilling the Dearborn Discovery Core (DDC) and graduation requirements.

In addition to the major requirements, students must complete all CASL Degree Requirements (http://catalog.umd.umich.edu/undergraduate/college-arts-sciences-letters/).

Prerequisites to the Major

A solid background in mathematics is essential to success in any of the scientific disciplines. Incoming students who intend to major in Chemistry should have completed at least three years of high school mathematics. First year students should plan to enroll in MATH 105, MATH 115, or MATH 116 based on the results of their math placement tests. The CHEM 134 and CHEM 136 or CHEM 144 and CHEM 146 sequence is a prerequisite to many other courses in the Natural Sciences Department; students should complete this sequence as soon as possible.

Chemistry majors must complete the following 40 credit hours of prerequisite courses. These courses should be completed early in the student's four-year curriculum.

Code	Title	Credit Hours
Select one of the following:		8
CHEM 134 & CHEM 136	General Chemistry IA and General Chemistry IIA (OR)	
CHEM 144 & CHEM 146	Gen Chemistry IB and General Chemistry IIB	
CHEM 225 & CHEM 226 & CHEM 227	Organic Chemistry I and Organic Chemistry II and Organic Chemistry Laboratory	8
BIOL 140	Intro Molec & Cellular Biology	4
PHYS 150 & PHYS 151	General Physics I and General Physics II [1]	8
MATH 115	Calculus I	4
MATH 116	Calculus II	4
MATH 215	Calculus III	4
or MATH 205	Calc III for Engin Students	
Total Credit Hours		**40**

[1] The physics prerequisite may also be satisfied by completing PHYS 125 and PHYS 126 **and** an upper-level physics course, such as PHYS 305.The upper level PHYS course used in this substitution **cannot** be used toward the cognate requirement.

Major Requirements

Code	Title	Credit Hours
Required Courses		
CHEM 303	Inorganic Chemistry I	3
CHEM 344	Quantitative Analysis	4
CHEM 368	Physical Chemistry I	3
CHEM/BCHM/BIOL 370	Principles of Biochemistry	3
CHEM 403	Inorganic Chemistry II	3
CHEM 447	Instrumental Methods of Analys	4
CHEM 450	Adv Org Syn & Character Lab	1
CHEM 452	Adv Inorg Synth & Char Lab	1
CHEM 469	Physical Chemistry II	3
CHEM 481	Physicochemical Measurements	2
CHEM 493	Chemistry Capstone Portfolio [1]	1
Elective Courses		
Select 3 elective credits from:		3
CHEM/ESCI 348	Environmental Chemistry	
CHEM/ESCI 352	Introduction to Toxicology	
CHEM 390	Current Topics in Chemistry	
CHEM 426	Advanced Organic Chemistry	
CHEM/BCHM 430	Bioinorganic Chemistry	
CHEM 435	Green Chemistry	
CHEM 436	Polymer Chemistry	
CHEM 437	Nano-Biotechnology	
CHEM/BCHM/BIOL 472	Biochemistry Laboratory I	
CHEM/BCHM/BIOL 473	Biochemistry Laboratory II	
CHEM 490	Topics in Chemistry	
Cognates		
Students must complete at least six credit hours upper level (300+ level) from: Biology (BIOL), Biochemistry (BCHM), Environmental Science (ESCI), Geology (GEOL), Mathematics (MATH), Microbiology (MICR), Statistics (STAT), or Physics (PHYS). The six credit hours need not be from a single discipline. [2]		6
Total Credit Hours		**37**

[1] CHEM 493 is a capstone portfolio course that requires data from various courses throughout the CACS curriculum. Students should discuss requirements with a Chemistry faculty mentor at the earliest opportunity and be aware of the benchmarks of the CHEM 493 course so that requirements will be completed by their final semester when they will register for CHEM 493.

[2] Excluding MATH 385, MATH 386, MATH 387, MATH 391, MATH 442, MATH 443, MATH 444, MATH 445, MATH 446, MATH 447, MATH 449, MATH 486. Only one of STAT 301 or STAT 325.

Notes:

1. A maximum of 44 hrs. in CHEM (excluding CHEM 134, CHEM 136, CHEM 144, CHEM 146) may count in the 120 required for graduation.
2. At least 12 of the 31 upper level hours in CHEM must be elected at UM-Dearborn.
3. CHEM 470 and CHEM 471 can be used in place of CHEM 370, however, CHEM 470 alone cannot be used for this substitution. Students cannot take both CHEM 370 and CHEM 470 or CHEM 471 or any combination to fulfill major, cognate or minor requirements.
4. A maximum of 6 hrs. of independent study/research in any Dept. of Natural Sciences discipline may count towards the 120 hours required to graduate.

Minor or Integrative Studies Concentration Requirements

A minor or concentration consists of 12 credit hours of upper-level courses in chemistry (CHEM). A maximum of one credit hour of independent study/research may be used to fulfill the requirement (CHEM 495, CHEM 498, CHEM 499)

- A minimum GPA of 2.0 is required for the minor/concentration. The GPA is based on all coursework required within the minor (excluding prerequisites).
- A minimum of 9 credits must be completed at UM-Dearborn for a 12 credit minor/concentration.
- A minimum of 12 credits must be completed at UM-Dearborn for a 15 or more credit minor/concentration.
- Courses within a minor/concentration cannot be taken as Pass/Fail (P/F)
- Only 3 credit hours of independent study or internship may be used to fulfill the requirements for a 12 credit hour minor/concentration. Only 6 credit hours of such credit may be used in a 15 or more credit hour minor/concentration.
- Minors requiring 12 credits may share one course with a major. Minors requiring 15 credits or more may share two courses with a major. This does not apply to concentrations for the Integrative Studies major.

Learning Goals

1. Master a broad set of fundamentals in the basic areas of the chemical discipline namely organic, inorganic, analytical, and physical.
2. Understand the objectives of chemical experiments, properly and safely carry out the experiments, and appropriately record and analyze results.
3. Communicate orally and in writing scientific concepts to other scientists and to the general public.
4. Skillfully utilize the chemical literature.
5. Have the ability to effectively pursue career objectives in an advanced professional or graduate school education, a scientific career in government or industry, or a career in teaching.