CHEMISTRY (PROFESSIONAL/ PRE-HEALTH)

The **Bachelor of Science in Chemistry – Professional/Pre-Health** at the University of Michigan-Dearborn provides a flexible and modern pathway for students who want to apply chemistry in professional, interdisciplinary, or health-related careers. This program offers two targeted options—**Professional** and **Pre-Health**—that prepare students for diverse opportunities in science, healthcare, and industry.

The **Professional Path** is designed for students who wish to combine their chemistry background with fields such as business, environmental science, data analytics, law, communication, or public policy. This option emphasizes applied chemical knowledge, problem-solving, and professional skills that prepare graduates for immediate employment in technical, regulatory, and analytical roles, or for advanced studies such as an MBA, JD, or MS in Environmental Science.

The **Pre-Health Path** is tailored for students preparing for professional programs in medicine, dentistry, pharmacy, physician assistant studies, or optometry. The curriculum builds a strong foundation in chemistry, biochemistry, and biology, while maintaining accessible math prerequisites that promote student success. Coursework emphasizes analytical reasoning, experimental techniques, and data interpretation skills essential for standardized tests such as the MCAT, DAT, and GRE.

Both paths share a rigorous chemistry core that integrates theory with hands-on laboratory experiences using modern instrumentation. Students learn to analyze and solve real-world problems, communicate scientific information effectively, and explore the ethical and societal dimensions of chemistry in contemporary contexts.

Graduates of the **Chemistry – Professional/Pre-Health** will possess the scientific literacy, technical competence, and professional versatility to thrive in a variety of careers or pursue advanced study in graduate and professional programs, contributing meaningfully to science, health, and society.

Dearborn Discovery Core (General Education)

All students must satisfy the University's Dearborn Discovery Core requirements (https://catalog.umd.umich.edu/undergraduate/gen_ed_ddc/), in addition to the requirements for the major. Students must also complete all CASL Degree Requirements. (https://catalog.umd.umich.edu/undergraduate/college-arts-sciences-letters/)

Prerequisites to the Major

A strong foundation in chemistry and quantitative reasoning is essential for success in the Chemistry – Professional/Pre-Health program. Incoming students should have completed at least two years of high school mathematics, including algebra and introductory chemistry. First-year students are encouraged to enroll in **MATH 101, MATH 105, or MATH 115**, depending on their placement results and academic goals. Students pursuing the Pre-Health Path should complete **CHEM 134** and **CHEM 136** (General Chemistry I and II) during their first year, as these courses form the foundation for advanced coursework in organic chemistry, biochemistry, and biology required for professional-school preparation. Those following the Professional Path are also advised to complete the general chemistry sequence early, as it provides essential laboratory and problem-solving skills applicable across scientific and professional fields.

Chemistry majors must complete the following 43 credit hours of prerequisite courses. These courses should be completed early in the student's four-year curriculum.

Code	Title	Credit Hours
BIOL 130	Intro Org and Environ Biology	4
BIOL 140	Intro Molec & Cellular Biology	4
CHEM 134 & CHEM 136	General Chemistry IA and General Chemistry IIA	8
CHEM 225 & CHEM 226 & CHEM 227	Organic Chemistry I and Organic Chemistry II and Organic Chemistry Laboratory	10
MATH 101	Trigonometry for Calculus	4
or MATH 105	Pre-Calculus	
or MATH 115	Calculus I	
NSCI 102	Pre-Health Careers: Introduction and Preparation	2
PHYS 125	Introductory Physics I	3
PHYS 125L	Introductory Physics I Lab/Dis	1
PHYS 126	Introductory Physics II	3
PHYS 126L	Intro Physics II Lab/Dis	1
STAT 263	Introduction to Statistics	3
or STAT 301	Biostatistics I	
Total Credit Hours		**43**

Major Requirements

Code	Title	Credit Hours
Core Courses		
CHEM 303	Inorganic Chemistry I	4
CHEM 343	Analytical Chemistry for Life Sciences [1]	4
CHEM 350	Physical Chemistry for Life Sciences [2]	4
CHEM/BCHM/ BIOL 370	Principles of Biochemistry [3]	4
Chemistry Elective		
Select one course from the following:		4
CHEM 430	Bioinorganic Chemistry	
CHEM 435	Green Chemistry	
CHEM 437	Nano-Biotechnology	
CHEM 438	Medicinal Chemistry: Drug Design & Development	
Biology/Health Science/other Elective		
Select four courses from the following:		13-16
BIOL 285	Microbiology	
BIOL 301	Cell Biology	
BIOL 303	Comparative Animal Physiology	
BIOL 306	General Genetics	
BIOL 317	Advanced Human Anatomy & Physiology	
BIOL 350	Principles of Neurobiology and Neuroendocrinology	
BIOL 357	Human Physiology	
BIOL 402	Physiology of Excitable Cells [4]	
BIOL 455	Immunology [5]	

BIOL 476	Cancer Cell Biology	
BIOL 480	Neurobiology of Brain Disorders [6]	
CHEM 348	Environmental Chemistry	
CHEM 352	Introduction to Toxicology	
CHEM 403	Inorganic Chemistry II [7]	
CIS 200	Computer Science II	
CIS 298	Intro to Python [8]	
ESCI 312	Environmental Ethics [9]	
MICR 450	Virology	
PHIL 442	Medical Ethics [9]	
Capstone		
Select one of the following:		1-3
CHEM 497	Seminar in Chemistry	
CHEM 499	Laboratory Research in Chem	
Total Credit Hours		**34-39**

1 CHEM 344 may substitute for CHEM 343.
2 CHEM 368 may substitute for CHEM 350.
3 CHEM 470 and CHEM 471 may substitute for 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 Prerequisites: BIOL 303 or BIOL 305 or BIOL 350 or BIOL 357
5 Prerequisite: BIOL 301
6 Prerequisite: BIOL 350 or BIOL 357 or BIOL 306 or BIOL 317
7 Prerequisites: CHEM 303 and CHEM 368
8 Prerequisite: CIS 200
9 Prerequisite: PHIL 100 or PHIL 233 or PHIL 240 or PHIL 301 or PHIL 302 or PHIL 306 or PHIL 335 or PHIL 365 or PHIL 375 or PHIL 441 or PHIL 442 or ENST 301

Notes:

1. At least 16 of the 34 upper-level hours in CHEM must be elected at UM-Dearborn.
2. A maximum of 8 hrs. of independent study/research in any Department of Natural Sciences discipline may count towards the 120 hours required to graduate.

Learning Goals

- Demonstrate Core Chemical Competence:
  - Students will demonstrate a comprehensive understanding of the fundamental principles of general, organic, analytical, physical, and biochemistry, and apply these principles to explain chemical structure, reactivity, and function in physical, biological, and environmental systems.
- Apply Quantitative and Analytical Skills:
  - Students will design and interpret experiments, collect and analyze quantitative data using appropriate statistical and computational tools, and draw evidence-based conclusions consistent with scientific reasoning.
- Integrate Chemistry with Professional or Health Contexts:
  - Students will connect chemical knowledge to interdisciplinary applications in professional, industrial, or healthcare settings, demonstrating how chemistry informs problem-solving in areas such as medicine, environmental science, business, and policy.
- Develop Effective Communication and Ethical Awareness:
  - Students will communicate chemical and scientific information clearly and professionally in written, oral, and visual formats, and will recognize the ethical, societal, and environmental responsibilities associated with the practice of chemistry.
- Prepare for Career and Professional Advancement:
  - Students will be prepared to enter the workforce or pursue advanced education in professional programs (medicine, dentistry, pharmacy, physician assistant, optometry) or graduate study in science or allied disciplines through experiential learning, critical thinking, and career readiness training.