

Chemistry/Physics ! College of Science & Mathematics

About the Program

Overview

The major in Chemistry is designed to provide students with fundamental concepts, as well as theoretical and practical aspects unique to the field. A minor in Physics is also available. Students are prepared for advanced study in graduate schools and/or for employment in various settings. The major also offers excellent preparation for teaching.

Department history/mission

The Chemistry major is under the umbrella of the Physical and Applied Science department. It has been part of Madonna University since its founding.

Unique features

- Scholarly instructors available to work with the student in both the classroom and laboratory
- Provides preparation for research careers, graduate studies, and professional studies
- Opportunities for cooperative education
- Provides varied laboratory experiences
- Small class sizes permit hands-on experience with state-of-the-art instrumentation and one-on-one contact between students and instructors
- The department houses a wide variety of state-of-the-art instrumentation: Modern IR, UV-VIS, differential scanning colorimeter (dsc), HPLC, GC, solution colorimeter, fluorimeter and multiport ultrafast centrifuge.
- Experienced advisors to direct students toward career goals.
- Students are taken to conferences where they interact with peers from other institutions

Plan of Study - Bachelor's Degree

Chemistry Major (38 s.h.)

Required Major Courses:

CHM 1110	General Chemistry I	4 s.h.
CHM 1120	General Chemistry II	4 s.h.
CHM 2210	Organic Chemistry I	4 s.h.
CHM 2220	Organic Chemistry II	4 s.h.
CHM 3310	Quantitative Analysis	4 s.h.
CHM 3510	Advanced Inorganic Chemistry	4 s.h.
CHM 4410	Physical Chemistry I	4 s.h.
CHM 4420	Physical Chemistry II	4 s.h.
CHM 4510	Instrumental Analysis	4 s.h.
CHM 4950	Senior Seminar	<u>2 s.h.</u>
		38 s.h.

Recommended Electives:

CHM 3610	Biochemistry I	4 s.h.
CHM 3620	Biochemistry II	4 s.h.
CHM 4900	Problems in Chemistry	<u>1-4 s.h.</u>
		9-12 s.h.

Required Support Courses (20 s.h.):

CIS 2800	or Introduction to Visual Basic Programming	3 s.h.
CSC 2470	Programming: FORTRAN	3 s.h.
MTH 2510	Calculus with Analytic Geometry I	5 s.h.
MTH 2520	Calculus with Analytic Geometry II	4 s.h.
PHY 2530	General Physics I	4 s.h.
PHY 2540	General Physics II	<u>4 s.h.</u>
		20 s.h.

NOTE: Students seeking Teacher Certification are also required to take (1) CHM 3610 Biochemistry I as part of the major, and (2) NSC 2160 Earth Science or NSC 3290 Principles of Astronomy as a support course.

Plan of Study - Chemistry Minor

Chemistry Minor (20 s.h.)

Required Minor Courses:

CHM 1110	General Chemistry I	4 s.h.
CHM 1120	General Chemistry II	4 s.h.
CHM 2210	Organic Chemistry I	4 s.h.
CHM 2220	Organic Chemistry II	4 s.h.
CHM 3610	Biochemistry I	4 s.h.
CHM 3310	Quantitative Analysis	<u>4 s.h.</u>
		20 s.h.

Plan of Study - Physics Minor

Physics Minor (20 s.h.)

Required Minor Courses:

PHY 2530	General Physics I	4 s.h.
PHY 2540	General Physics II	4 s.h.
PHY 2710	Fundamental Electronics	4 s.h.
PHY 3510	Modern Physics: Atomic & Nuclear	4 s.h.
PHY 4510	Electronics: Digital Techniques	<u>4 s.h.</u>
		20 s.h.

Occupational Safety & Health Minor (24 s.h.)

Required Minor Courses:

OSH 1020	Standards & Regulations	3 s.h.
OSH 3220	Inspection & Survey of Facilities	3 s.h.
OSH 3310	Safety Program Management	3 s.h.
OSH 3520	Industrial Hygiene I	3 s.h.
OSH 3980	Industrial Hygiene II	3 s.h.
OSH 4510	Hazardous Materials	3 s.h.
	Major Electives	<u>6 s.h.</u>
		24 s.h.

Required Support Courses:

BIO 2240	or Basic Human Physiology	4 s.h.
NSC 1250	Health Problems	4 s.h.
CHM 1110	General Chemistry I	4 s.h.
CHM 1610	Intro to Life Chemistry	4 s.h.
MTH 1050	and Intermediate Algebra	4 s.h.
MTH 1060	or Trigonometry	3 s.h.
MTH 1210	Precalculus	5 s.h.
PHY 2530	General Physics I	<u>4 s.h.</u>
		21-23 s.h.

Teacher Certification

Teacher certification available. Contact the Education Department at 734/432-5655 or 432-5647.

Recent Student Research

List of recent senior projects:

- Thermal Analysis of UV-Absorbers used in the Paint Industry
- Art Conservation
- Luminol in Forensic Detective Work



For Admissions Information

Office of Admissions
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For Program Information

Dr. Stanley Ngeyi, Chair
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Madonna University reserves the right to withdraw or modify information in this brochure.

See Advisor/Admissions Office for current information.

Madonna University guarantees the right to equal educational opportunity without discrimination because of race, religion, sex, national origin, age, or disabilities. 10/01

Selected Course Offerings

General Chemistry I

Principles of chemistry including atomic structure and periodicity, chemical bonding, stoichiometry, gas laws, solution concepts, acid-base theory, redox processes, and equilibrium.

Quantitative Analysis

Theory and techniques of classical quantitative analysis, including acquisition and evaluation of analytical data from gravimetry, titrimetry, potentiometry, and spectrophotometry techniques.

Organic Chemistry I

Structure and classification of compounds of carbon with stress on the aliphatics; IUPAC nomenclature; properties, characteristic reactions of the common functional groups, especially of the oxygen functions; concepts of stereochemistry; introduction to mechanisms; stress on Bronsted and Lewis acid/base processes.

General Physics I

Fundamental methods of mechanics, molecular physics, heat and sound. Opportunity for experiments at Argonne National Laboratory near Chicago.

Physical Chemistry I

Kinetic, mechanisms, rate laws, properties of solids, liquids, and gases; kinetic theory of gases, phase rules, thermodynamics, equilibria, chemical activity, and electrochemistry; introduction to statistical mechanics.

Physical Chemistry II

Atomic and molecular structure, quantum theory and mechanics, analytical spectroscopy, selection rules, photochemistry.

Advanced Inorganic Chemistry

Descriptive chemistry of the representative elements, transition metal complexes and organometallic compounds; ligand field theory, molecular orbital and valence bond theories, symmetry and group equivalent.

Senior Seminar

Preparation and presentation of a scientific paper after completion of a library or laboratory research project.

The Faculty

Faculty members engage in research and/or projects which result in publication. Faculty members have years of experience which they bring to the classroom. Average years of university instruction is 14 years.

Stanley Ngeyi, Chairperson Physical & Applied Science

(B.S., University of Yaounde'; M.S., Ph.D., University of Michigan)

Maria Surma Kuhn, Chemistry

(B.S., M.S. Wayne State University, Ph.D. candidate, Wayne State University)

Afif Jawad Physics (B.S., M.S., Ph.D., Wayne State University)

Asaad Istephan, Natural Science (BSC, Liverpool University, U.K., M.S., Ph.D., Birmingham University, U.K.)

Career Options

- Research
- Education
- Environmental studies
- Graduate studies
- Professional schools:
 - Medical
 - Veterinary
 - Law
 - Engineering
 - Environmental studies

What Grads Say

"The chemistry major prepared me for a research support position at Ford Motor Company which served as a stepping stone to Veterinary school. I am now a practicing Veterinarian." *L.C.*

"Thanks to the Chemistry program at Madonna University for providing me with the background to do my doctorate in toxicology. I am presently employed at Dow Corning in Midland, MI." *Dr. K.*

"Teaching High School Chemistry as well as Physics and Mathematics has been made easier with the instruction received at Madonna University. I have completed my master's degree in Chemistry at Eastern Michigan University."

J. Van Camp