

# Medicinal Plant Chemistry

This is the first and only program of its kind in the country, designed to support and enhance the burgeoning natural pharmaceuticals, herbal extract and cannabis markets. This degree prepares students to enter either the business or laboratory side of these lucrative industries.

This is an interdisciplinary program that requires core chemistry courses (general, organic, and analytical) along with courses in biology and geography that are relevant to plants. Students can choose one of two tracks. One is the entrepreneurial track in which students will learn the basics of business and marketing. This is for someone who may want to start their own analytical lab or other business related to plant medicinal products. The other is the analytical track where students get more training in chemical analysis. Students who complete this track would be eligible for a position in analytical lab.

## Skills and Competencies

The program is designed so that students will be doing research projects, starting with cultivating plants, then extracting them and identifying the compounds that are in the extracts using analytical methods such as LC-MS and GC-MS. Our capstone course CH420/421, is a year-long experience for seniors in the program in which the students will do their own research project. Students will gain hands on experience with instrumentation they are not likely to operate in any other undergraduate program, including our brand new Shimadzu LCMS08040, a tandem MS/MS instrument that provides ultra fast quantitative analysis and incredibly powerful qualitative analysis.

## Course Work

This degree includes the following courses as part of the program requirements, and specific major requirements along with general education courses and graduation requirements.

### Chemistry

CH111	General Chemistry I (5 cr.)
CH112	General Chemistry II (5 cr.)
CH242	Quantitative Analysis (2 cr.)
CH315	Organic Chemistry I (3 cr.)
CH317	Organic Chemistry Lab I (1 cr.)
CH325	Organic Chemistry II (3 cr.)
CH327	Organic Chemistry Lab II (1 cr.)
CH435	Gas and Liquid Chromatography (2 cr.)
CH450	Biochemistry I (4 cr.)
CH189	Medicinal Plant Chemistry Seminar I
CH289	Medicinal Plant Chemistry Seminar II (1 cr.)
CH389	Medicinal Plant Chemistry Seminar III (1 cr.)
CH420	Medicinal Plant Chemistry I (5 cr.)
CH421	Medicinal Plant Chemistry II (5 cr.)

### Biology

BI111	Introductory Biology: Principles (4 cr.)
BI112	Introductory Biology: Diversity (4 cr.)
BI230	Plant Kingdom (4 cr.)
BI431	Plant Physiology (4 cr.)

### Other Required Courses

MA109	Intro to Probability and Statistics (4 cr.)
GC100	Physical Geography (4 cr.)
GC202	Soils (4 cr.)

### Entrepreneurial Track

ACT230	Principles of Accounting I (4 cr.)
ACT240	Principles of Accounting II (4 cr.)
MGT215	Entrepreneurship (4 cr.)
FIN351	Financial management I (4 cr.)
FIN413	New Venture Finance: Capital Formation and Legal Issues (4 cr.)
MKT230	Introduction to Marketing or
MKT310	Marketing for Entrepreneurship (4 cr.)

### Bio-Analytical Track

CH215	Chemistry of the Elements (4 cr.)
CH241	Chemical Equilibrium (3 cr.)
CH437	Atomic Spectrometry (1 cr.)
BI218	Introduction to Cell and Molecular Biology (4 cr.)
BI312	Genetics (4 cr.)
BI412	Biostatistics (4 cr.)
BI433	Boreal Flora (2-3 cr.)

Detailed course descriptions can be found at [www.nmu.edu/bulletin](http://www.nmu.edu/bulletin).

## Career Development

You should begin the resume-building process as soon as you can. The Academic and Career Advisement Center can assist you with career planning, while Career Services will help you fine tune your resume and look for jobs related to your field. In the meantime, the more hands-on experience you have, the better the chances are that you will find a job or undergraduate research. Becoming involved in a professional related internship is a way to develop your professional skills and gain experience. Your academic course work is important as well, so be sure to maintain a high grade point average.

## Additional Considerations

During the first year of the program, students will participate in a seminar course, which will include students in their first, second and third years. There will be opportunities to explore the field of medicinal plant chemistry, investigate career options, learn about current developments in the field, and develop ideas for an independent project through interactions with more experienced students. After completing individual projects designed in the seminar course, fourth year students will ultimately return to present their findings to the class, providing the same valuable guidance to the junior peers which had once been provided to them.

## Job Outlook

"In 2015, Forbes called legal cannabis the best startup opportunity for entrepreneurs and investors and the marijuana economy is projected to grow by triple-digit percentage points by 2010. Analytical Laboratories will play a critical role in growth. In fact, cannabis chemistry is not a recognized subdivision of the American Chemical Society"- Professor Brandon Canfield.

# Potential Careers

NMU's Medicinal Plant Chemistry Program prepares students for employment in the following areas:

Analytical Chemist

Biotechnologist

Chemical Engineer

Environmental Analysis

Fermentation Science

Healthcare Scientist, Clinical

Biochemistry

Herbal Supplements

Food Chemistry

Nanotechnologist

Pharmacologist

Research Scientist

(Physical Sciences)

Scientific Laboratory Technician

Toxicologist

# Additional Resources and Information

For Career Planning and Opportunities:  
Academic & Career Advisement Center  
3302.1 C.B. Hedgcock  
906-227-2971  
[www.nmu.edu/acac](http://www.nmu.edu/acac)

Chemistry Department  
3301 New Science Facility  
906-227-2911  
[www.nmu.edu/chemistry](http://www.nmu.edu/chemistry)

For Job Search, Resume and Career Information:  
Career Services  
3302.3 C.B. Hedgcock  
906-227-2800  
[www.nmu.edu/careers](http://www.nmu.edu/careers)

For Information about NMU Student Organizations Associated with this Major Contact:  
Center for Student Enrichment  
1206 University Center  
906-227-2439  
[www.nmu.edu/cse](http://www.nmu.edu/cse)

Internet Resource Links:  
[www.careers.org](http://www.careers.org)  
[www.bls.gov](http://www.bls.gov)

For more information visit:  
[www.nmu.edu/medicinalplantchemistry](http://www.nmu.edu/medicinalplantchemistry)

or contact:  
Brandon Canfield and Mark Paulsen in the Chemistry Department



**NORTHERN MICHIGAN  
UNIVERSITY**

MARQUETTE, MICHIGAN

The Academic & Career Advisement Center  
2021



What to do with  
a major in...

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