CHEMISTRY MAJOR (BS)

Department website (https://www.uwp.edu/learn/programs/chemistry.cfm)

College: College of Natural & Health Sciences

Preparation for Graduate School

Some graduate programs require that specific courses be taken for admission. Students considering graduate study should consult their advisor and the admissions office of the graduate program.

Program Learning Outcomes

1. Students develop a knowledge and understanding of chemistry and use it to communicate results from scientific studies in formats suitable to the profession. Students will evaluate literature and other information relevant to their work, summarize information in tables and graphs, write effective reports and give effective oral presentations.
2. Students perform and evaluate scientific experiments and studies in the field of chemistry. Students will perform experiments using accepted laboratory practices, evaluate results in the context of relevant scientific principles, and propose appropriate future directions for the study based upon the findings.
3. Students act as socially responsible members of the profession. Students will demonstrate concern for the health and safety of others by using proper safety protocols, apply chemical principles to everyday life, and treat each other with respect.

Program-Specific Policies

Redundant Courses

Credits earned in courses which in large part duplicate the content of any of those listed above cannot be applied toward the major or used in computing the GPA for the major.

Honors in Chemistry

To be eligible for a B.S. with honors in chemistry, a chemistry major must attain a GPA of 3.25 or better in all chemistry courses taken and complete a senior thesis (CHEM 497 Senior Thesis) and defend it before a committee of three faculty members, at least two of whom are from chemistry. In addition, an overall GPA of at least 3.00 must be attained.

Requirements for the Chemistry Major

At least 15 credits of upper-level courses in the major must be completed at UW-Parkside. Chemistry majors must have a minimum GPA of 2.50 in all courses required for the major, including math and physics. The following courses are required of all chemistry majors. Students are expected to pay attention to required prerequisites and then follow the additional requirements associated with their specific concentration. Undergraduate research is strongly encouraged.

Code	Title	Credits
College of Natural and Health Sciences requirement		
New entering students, and transfer students with less than 30 college credits, choosing a major in the College of Natural and Health Sciences are required to take this course.		
UWP 101	First Year Seminar: Natural and Health Sciences	1
Required Introductory Chemistry Courses		
CHEM 101	General Chemistry I	4
CHEM 102	General Chemistry II	4
CHEM 103	General Chemistry Lab I	1
CHEM 104	General Chemistry Lab II	1
Required Introductory Chemistry Courses Subtotal		11
Required Chemistry Courses		
CHEM 155	Chemistry Seminar: Careers, Safety and Literature	3
CHEM 206	Quantitative Chemical Analysis	5
CHEM 302	Physical Chemistry I	4
CHEM 321	Organic Chemistry I	4
CHEM 322	Organic Chemistry II	4
CHEM 323	Organic Chemistry Lab	2
Required Chemistry Courses Subtotal		22
Required Courses in Mathematics		
MATH 221	Calculus and Analytic Geometry I	5
MATH 222	Calculus and Analytic Geometry II	5
Required Courses in Mathematics Subtotal		10
Capstone Requirement		
CHEM 495	Senior Seminar	1
or CHEM 497	Senior Thesis	
Capstone Requirement Subtotal		1
Concentration Options		
Choose one option		31-62
Concentration Options Subtotal		31-62
Total Credits		**75-106**

Concentration Options

General Chemistry Concentration

Students completing this concentration are equipped with essential foundational knowledge and skills for many entry level positions and to consider a career in secondary education. This concentration is also ideal for students who are already employed in the field and need a degree to increase their career options. Students who complete this concentration are also eligible for a certificate in green chemistry. It is the responsibility of the student to declare the certificate, it is not automatically awarded.

Code	Title	Credits
Required Chemistry Courses		
CHEM 210	Introduction to Inorganic Chemistry	3
CHEM 230	Introduction to Green Chemistry	2
CHEM 303	Physical Chemistry II	3
CHEM 304	Physical Chemistry Lab I	2
CHEM 308	Biochemistry Laboratory	2
CHEM 324	Chemistry of Biological Systems	3
CHEM 400	Instrumental Analysis Laboratory	3
Required Chemistry Courses Subtotal		18
Elective Chemistry Course		
Select one of the following:		3
CHEM 306	Chemical Instrumentation	
CHEM 402	Advanced Organic Chemistry	
CHEM 410	Advanced Biochemistry	
Elective Chemistry Course Subtotal		3
Required Physics Courses		
PHYS 201	General Physics I	5

PHYS 202	General Physics II	5
Required Physics Courses Subtotal		10
Total Credits		**31**

Chemistry for Pre-Health Professions Concentration [Pre-Medical/ Pharmacy]

This curriculum is specifically designed for students continuing into professional health schools. Students who complete this concentration are also eligible for a minor in biological sciences. It is the responsibility of the student to declare this minor, it is not automatically awarded.

Code	Title	Credits
Essential Preparatory Courses		
COMM 105	Public Speaking for the 21st Century	3
ECON 120	Principles of Microeconomics	3
ENGL 167	Introduction to Literature	3
PSYC 101	Introduction to Psychological Science	3
SOCA 101	Introduction to Sociology	3
Essential Preparatory Courses Subtotal		15
Required Biological Sciences Courses		
BIOS 101	Bioscience	4
BIOS 102	Organismal Biology	4
BIOS 210	Biostatistics	4
BIOS 260	General Genetics	4
BIOS 303	Microbiology	4
BIOS 341	Mammalian Physiology	3
Required Biological Sciences Courses Subtotal		23
Required Chemistry Courses		
CHEM 303	Physical Chemistry II	3
CHEM 304	Physical Chemistry Lab I	2
CHEM/BIOS 307	Biochemical Metabolism	3
CHEM 324	Chemistry of Biological Systems	3
CHEM 400	Instrumental Analysis Laboratory	3
Required Chemistry Courses Subtotal		14
Required Physics Courses		
PHYS 201	General Physics I	5
PHYS 202	General Physics II	5
Required Physics Courses Subtotal		10
Total Credits		**62**

Biochemistry Concentration

The biochemistry concentration provides additional laboratory experience compared to the pre-health professions concentration and is best suited to students continuing in graduate schools with a specific interest in drug design, medicinal chemistry and toxicology. Students who complete this concentration are also eligible for a minor in biological sciences. It is the responsibility of the student to declare this minor, it is not automatically awarded.

Code	Title	Credits
Required Biological Sciences Courses		
BIOS 101	Bioscience	4
BIOS 102	Organismal Biology	4
BIOS 210	Biostatistics	4
BIOS 260	General Genetics	4
BIOS 309	Molecular Biology	3
Required Biological Sciences Courses Subtotal		19
Elective in Biological Sciences		
BIOS 453	Molecular Biology and Bioinformatics of Nucleic Acids	4
or BIOS 455	Protein Biochemistry and Bioinformatics	
Elective in Biological Sciences Subtotal		4
Required Chemistry Courses		
CHEM 303	Physical Chemistry II	3
CHEM 304	Physical Chemistry Lab I	2
CHEM/BIOS 307	Biochemical Metabolism	3
CHEM 308	Biochemistry Laboratory	2
CHEM 324	Chemistry of Biological Systems	3
CHEM 400	Instrumental Analysis Laboratory	3
CHEM 410	Advanced Biochemistry	3
Required Chemistry Courses Subtotal		19
Required Physics Courses		
PHYS 201	General Physics I	5
PHYS 202	General Physics II	5
Required Physics Courses Subtotal		10
Total Credits		**52**

Industrial Chemistry Concentration

The industrial chemistry concentration equips students for non-laboratory intensive career in the chemical industry including product development, business development, sales, marketing research, technical service and manufacturing. These positions are at the interface between product development and applications. Students who complete this concentration are also eligible for the certificate in green chemistry, but it is the responsibility of the student to declare the certificate.

Code	Title	Credits
Required Business and Economics Courses		
ACCT 201	Financial Accounting	3
ACCT 202	Managerial Accounting	3
ECON 120	Principles of Microeconomics	3
ECON 121	Principles of Macroeconomics	3
FIN 330	Managerial Finance	3
MGT 349	Organizational Behavior	3
MKT 350	Marketing Principles	3
QM 210	Business Statistics I	3
Elective in management and/or marketing		3
Required Business and Economics Courses Subtotal		27
Required Chemistry Courses		
CHEM 210	Introduction to Inorganic Chemistry	3
CHEM 230	Introduction to Green Chemistry	2
CHEM 355	Survey of Industrial Chemistry	3
CHEM 494	Internship in Chemistry	1
Required Chemistry Courses Subtotal		9
In-Depth Elective Chemistry Course Sequence		
Choose one sequence:		5-6
Physical		
CHEM 303	Physical Chemistry II	
CHEM 304	Physical Chemistry Lab I	
Analytical		

CHEM 306	Chemical Instrumentation	
CHEM 400	Instrumental Analysis Laboratory	
Biochemistry		
CHEM/BIOS 307	Biochemical Metabolism	
or CHEM 324	Chemistry of Biological Systems	
CHEM 410	Advanced Biochemistry	
Organic		
CHEM 401	Advanced Organic Laboratory	
CHEM 402	Advanced Organic Chemistry	
In-Depth Elective Chemistry Course Sequence Subtotal		5-6
Required Physics Courses		
PHYS 105	College Physics I [1]	5
PHYS 106	College Physics II [1]	5
Required Physics Courses Subtotal		10
Total Credits		**51-52**

[1] Students may use PHYS 201 General Physics I and PHYS 202 General Physics II in place of PHYS 105 College Physics I and PHYS 106 College Physics II.

Natural Products Concentration

Natural products have had a major impact on chemistry, chemical biology and drug discovery and have been part of medical remedies since ancient times. The structural diversity of organic molecules produced in nature is matched only by the range of their biological activities and applications. Natural products represent an important source of leads for medicinal chemistry, and drugs developed from natural products are used for the treatment of cancer, cardiovascular diseases, as well as bacterial, viral and fungal infections. Students completing this concentration will be able to describe the biological activities of secondary metabolites, and develop and verify analytical methods for the extraction and analysis of active ingredients in natural products.

Code	Title	Credits
Required Chemistry Courses		
CHEM 306	Chemical Instrumentation	3
CHEM 324	Chemistry of Biological Systems	3
CHEM 350	Chemistry of Natural Products	3
CHEM 400	Instrumental Analysis Laboratory	3
CHEM 450	Current and Future Directions in Natural Products	3
Required Chemistry Courses Subtotal		15
Elective Chemistry Core		
Select three credits of the following:		3
Any combination of the following accepted but content must be related to Natural Products and suitable for capstone requirement.		
CHEM 494	Internship in Chemistry	
CHEM 499	Independent Study	
Elective Chemistry Core Subtotal		3
Required Biological Sciences Courses		
BIOS 101	Bioscience	4
BIOS 102	Organismal Biology	4
BIOS 324	Botany	4
BIOS 344	Plant Physiology	3
Required Biological Sciences Courses Subtotal		15
Required Physics Courses		
PHYS 105	College Physics I	5
PHYS 106	College Physics II	5
Required Physics Courses Subtotal		10
Capstone Chemistry Requirement		
CHEM 497	Senior Thesis	1
Capstone Chemistry Requirement Subtotal		1
Total Credits		**44**

Professional Chemistry Concentration [ACS Approved]

This concentration is approved by the American Chemical Society (ACS). Students who complete this concentration are registered with the ACS and have the certification recorded on their official University credentials. Participation in undergraduate research, independent study, is strongly encouraged. This concentration is also the premier choice for students planning to pursue graduate studies.

Code	Title	Credits
Required Chemistry Courses		
CHEM 210	Introduction to Inorganic Chemistry	3
CHEM 303	Physical Chemistry II	3
CHEM 304	Physical Chemistry Lab I	2
CHEM 308	Biochemistry Laboratory	2
CHEM 324	Chemistry of Biological Systems	3
CHEM 400	Instrumental Analysis Laboratory	3
CHEM 401	Advanced Organic Laboratory	3
Required Chemistry Courses Subtotal		19
Elective Chemistry Course		
Select one of the following:		3
CHEM 306	Chemical Instrumentation	
CHEM 402	Advanced Organic Chemistry	
CHEM 410	Advanced Biochemistry	
Elective Chemistry Course Subtotal		3
Required Physics Courses		
PHYS 201	General Physics I	5
PHYS 202	General Physics II	5
Required Physics Courses Subtotal		10
Total Credits		**32**

General University Degree Requirements (Bachelor's Degree)

In addition to individual program requirements, students must also fulfill the following requirements:

Requirement	Credits
Skills	7-8
General Education	36
Foreign Language**	6-8
Ethnic Diversity	3
Total	52-55

** Transfer students in sustainable management, and health information management and technology collaborative, online degree-completion programs, the business management online degree-completion program, and the flexible option degree-completion program will be exempt from

the university's foreign language requirement. See appropriate academic section for further information.

Skills Requirement (https://catalog.uwp.edu/policies/#skills)

Code	Title	Credits
Reading and Writing		
ENGL 101	Composition and Reading	3
Computational Skills		
Select one of the following:		4-5
MATH 102	Quantitative Reasoning	
MATH 103	Elementary Statistics	
MATH 104	College Mathematics with Applications	
MATH 111	College Algebra I	
Total Credits		**7-8**

General Education (https://catalog.uwp.edu/policies/#general)

- General Education Course List (https://catalog.uwp.edu/programs/general-education-program/#coursestext)

Foreign Language (https://catalog.uwp.edu/policies/#language)

Ethnic Diversity (https://catalog.uwp.edu/policies/#ethnic)

Degree Requirements

Requirement	Credits
Minimum Total Credits	120
Upper Level Credits (300 level or above)	36
Residency	30

Cumulative Degree GPA: 2.0 minimum

Course	Title	Credits
Year 1		
Fall Semester		
MATH 102	Quantitative Reasoning	4
ENGL 100	Fundamentals of English	3
Introductory Language		4
COMM 107	Communication and the Human Condition	3
	Credits	**14**
Spring Semester		
ENGL 101	Composition and Reading	3
COMM 105 or COMM 205	Public Speaking for the 21st Century or Oral Interpretation	3
COMM 108	Media and Society	3
Introductory Language		4
	Credits	**13**
	Total Credits	**27**