

# CHEMISTRY

Degree:	Bachelor of Science Bachelor of Arts
Specializations:	Chemistry (B.S. or B.A.), Chemistry/Biochemistry (B.S. or B.A.), Pre-Dental, Fast Track Master's
Minor:	Chemistry
Department:	Chemistry Building 58, Room 151 (850) 474-2739 <a href="http://uwf.edu/chemistry/">http://uwf.edu/chemistry/</a> <a href="mailto:chemistry@uwf.edu">chemistry@uwf.edu</a>
College:	Arts and Sciences
Semester Hours Required for Degree:	120

Faculty: M.T. Huggins (Chairperson), C.W.J. Chang (Emeritus), G. Chiu (Emerita), J.E. Gurst, W.P. Halpern (Emeritus), A.T. Royappa, T.M. Sirvent, P.S. Tanner, S.P. Tanner, L.W. ter Haar, P.P. Vaughan

The B.S. specializations in Chemistry and Chemistry/Biochemistry have been approved by the Committee on Professional Training of the American Chemical Society (ACS) and consists of courses designed to offer training in the fundamentals of chemistry. Opportunities exist for the student to take courses to prepare for a wide variety of careers in chemistry and related fields. The B.S. program is recommended for students wishing to enter graduate programs in chemistry or to find employment as professional chemists.

The B.A. specializations in Chemistry and Chemistry/Biochemistry are designed for students who need a strong background in chemistry for application in other fields such as business, education, forensic science, pre-medical, pre-dental, pre-law, and some environmental fields.

For highly qualified students, a fast-track program leading to a B.S. and an M.S. is available in biologically-related areas.

## PROGRAM REQUIREMENTS

In addition to general University requirements, students seeking the B.S. or B.A. in Chemistry must meet the requirements listed below.

Students should consult with their academic advisor for courses which may satisfy both the General Studies requirements and common prerequisites.

A grade of "C" or better is required in all common prerequisites. No grade below a "C-" in a major course may be applied toward graduation.

Chemistry B.S. and Chemistry/Biochemistry B.S. specialization majors must complete PHY 2048, PHY 2049 and BCH 3034/L for ACS certification. Chemistry/Biochemistry, B.S. Specialization majors must also take PCB 3063/L or MCB 3020/L plus one additional course in biochemistry for ACS certification.

Course descriptions are listed alphabetically by prefix in the back of this *Catalog*.

## BACHELOR OF SCIENCE

### CHEMISTRY B.S. SPECIALIZATION

#### General Studies (36 sh)

For additional information see the General Studies section of this Catalog.

#### Common Prerequisites (24 sh)

State mandated common prerequisites must be completed prior to graduation, but are not required for admission to the program. Courses in brackets indicate substitutes from Florida public community/junior colleges and universities.

- + CHM 2045/L General Chemistry I/Lab .....4  
[CHM x045/L, 1045C, 1045E, or 1040 & 1041]
- + CHM 2046/L General Chemistry II/Lab .....4  
[CHM x046/L, 1046C, 1046E]
- + MAC 2311 Analytic Geometry & Calculus I .....4  
[MAC x311, x281]
- + MAC 2312 Analytic Geometry & Calculus II .....4  
[MAC x312, x282]

*Choose one option:*

*Option 1*

- CHM 2210/L Organic Chemistry I/Lab .....4  
[CHM 2210C]
- CHM 2211/L Organic Chemistry II/Lab .....4  
[CHM 2211C]

*Option 2*

- + PHY 2048/L University Physics I/Lab .....4  
[PHY 2048C]
- + PHY 2049/L University Physics II/Lab .....4  
[PHY 2049C]

*or*

- + PHY 2053/L General Physics I/Lab .....4  
[PHY 2053C]
- + PHY 2054/L General Physics II/Lab .....4  
[PHY 2054C]

+ Indicates common prerequisites which can be used to satisfy General Studies requirements.

#### Lower Division Electives (0-13 sh)

Sufficient 1000/2000 level electives to complete at least 60 semester hours in the lower division. Current UWF students may use elective courses at any level (1000-4999) to meet this elective requirement. Majors should complete the Physics or Organic Chemistry sequence not completed in the Common Prerequisites.

#### Major (38-46 sh)

- CHM 3120/L Analytical Chemistry/Lab .....4
- CHM 3230 Organic Chemistry III .....3
- CHM 3410 Physical Chemistry I .....5
- CHM 3411 Physical Chemistry II .....4
- CHM 3740L Advanced Laboratory Techniques .....2
- CHM 3741L Physical Chemistry Laboratory .....2
- CHM 4130/L Instrumental Analysis/Lab .....4
- CHM 4610L Inorganic Synthesis .....1
- CHM 4611 Advanced Inorganic Chemistry .....4

*With departmental advisor approval,*

*choose three courses from:*

- BCH 3034/L General Biochemistry: Metabolism/Lab .....4
- CHM 4455/L Introduction to Polymer Science/Lab .....3
- CHM 4512 Computational Chemistry .....3
- CHM 4714C Materials, Chemistry, and Engineering .....3
- CHM 4912 Undergraduate Chemistry Research .....3  
Course offered 2-4 sh per semester
- CHM 4930 Seminar: Special Topics in  
Advanced Chemistry .....3  
Course offered 3-4 sh per semester

*If not completed at lower division:*

- CHM 2210/L Organic Chemistry I/Lab .....0-4
- CHM 2211/L Organic Chemistry II/Lab .....0-4

#### Major-Related (0-8 sh)

*If not completed at the lower division, choose one option:*

*Option 1*

- PHY 2048/L University Physics I/Lab .....4
- PHY 2049/L University Physics II/Lab .....4

*Option 2*

- PHY 2053/L General Physics I/Lab .....4
- PHY 2054/L General Physics II/Lab .....4

#### Upper Division Electives (14-22 sh)

Sufficient 3000/4000 level electives to meet UWF's requirement of 48 semester hours in the upper division or completion of all departmental requirements at the 3000/4000 level, whichever is greater.

### CHEMISTRY/BIOCHEMISTRY B.S. SPECIALIZATION

#### General Studies (36 sh)

For additional information see the General Studies section of this *Catalog*.

#### Common Prerequisites (32 sh)

State mandated common prerequisites must be completed prior to graduation, but are not required for admission to the program. Courses in brackets indicate substitutes from Florida public community/junior colleges and universities.

- + BOT 2010/L General Botany/Lab .....4  
[BSC 2011/L]
- + CHM 2045/L General Chemistry I/Lab .....4  
[CHM 2045C, CHM 2045E]
- + CHM 2046/L General Chemistry II/Lab .....4  
[CHM 2046C, CHM 2046E]
- + MAC 2311 Analytic Geometry & Calculus I .....4
- + MAC 2312 Analytic Geometry & Calculus II .....4
- + ZOO 1010/L General Zoology/Lab .....4  
[BSC 2010/L]

*Choose one option:*

*Option 1*

- CHM 2210/L Organic Chemistry I/Lab .....4  
[CHM 2210C]
- CHM 2211/L Organic Chemistry II/Lab .....4  
[CHM 2211C]

*Option 2*

+ PHY 2048/L	University Physics I/Lab	.....4
+ PHY 2049/L	University Physics II/Lab	.....4

*or*

+ PHY 2053/L	General Physics I/Lab	.....4
+ PHY 2054/L	General Physics II/Lab	.....4

+ Indicates common prerequisites which can be used to satisfy General Studies requirements.

**Lower Division Electives (0-5 sh)**

Sufficient 1000/2000 level electives to complete at least 60 semester hours in the lower division. Current UWF students may use elective courses at any level (1000-4999) to meet this elective requirement. Majors should complete the Physics or Organic Chemistry sequence not completed in the Common Prerequisites.

**Major (39-49 Hours)**

CHM 3120/L	Analytical Chemistry/Lab	.....4
CHM 3230	Organic Chemistry III	.....3
CHM 3410	Physical Chemistry I	.....5
CHM 3411	Physical Chemistry II	.....4
CHM 3740L	Advanced Laboratory Techniques	.....2
CHM 3741L	Physical Chemistry Laboratory	.....2
CHM 4610L	Inorganic Synthesis	.....1
CHM 4611	Inorganic Chemistry	.....4

*With approval of departmental advisor, choose two courses from Group A and two courses from Group B:*

*Group A*

BCH 3034/L	General Biochemistry: Metabolism/Lab	.....4
PCB 3063/L	Genetics/Laboratory	.....4
MCB 3020/L	Microbiology/Laboratory	.....4
PCB 4524/L	Molecular Biology/Laboratory	.....4

*Group B*

CHM 4130/L	Instrumental Analysis/Lab	.....4
CHM 4455/L	Introduction to Polymer Science/Lab	.....3
CHM 4512	Computational Chemistry	.....3
CHM 4714C	Materials, Chemistry, and Engineering	.....3
CHM 4912	Undergraduate Chemistry Research	.....3
	Course offered 2-4 sh per semester	
CHM 4930	Seminar: Special Topics in Advanced Chemistry	.....3-4
	Course offered 3-4 sh per semester	

*If not taken at the Lower Division:*

CHM 2210/L	Organic Chemistry I/Lab	.....0-4
CHM 2211/L	Organic Chemistry II/Lab	.....0-4

**Major-Related (0-8 sh)**

*If not completed at the Lower Division, choose one option:*

*Option 1*

PHY 2048/L	University Physics I/Lab	.....4
PHY 2049/L	University Physics II/Lab	.....4

*Option 2*

PHY 2053/L	General Physics I/Lab	.....4
PHY 2054/L	General Physics II/Lab	.....4

**Upper Division Electives (11-21 sh)**

Sufficient 3000/4000 level electives to meet UWF's requirement of 48 semester hours in the upper division or completion of all departmental requirements at the 3000/4000 level, whichever is greater.

**CHEMISTRY PRE-DENTAL  
SPECIALIZATION**

Students must comply with the admission requirements to this specialization discussed in the Pre-Dental Program description in the Undergraduate Degree Programs section of the *Catalog*. That section also explains the use of University of Florida dental (DEN) courses in the specialization.

**General Studies (36 sh)**

For additional information, see the General Studies section of this *Catalog*. Pre-Dental majors should take DEP 2004 to meet the Social Sciences/Behavioral perspectives component.

**Common Prerequisites (32 sh)**

Same as Chemistry/Biochemistry Specialization.

**Lower Division Electives (0-5)**

Sufficient 1000/2000 level electives to complete at least 60 semester hours in the lower division. Current UWF students may use elective courses at any level (1000-4999) to meet this elective requirement. Majors should complete the Physics or Organic Chemistry sequence not completed in the Common Prerequisites.

**Major (35-43 Hours)**

BCH 3033/L	Biochemistry I/Lab	.....4
CHM 3120/L	Analytical Chemistry/Lab	.....4
CHM 3230	Organic Chemistry III	.....3
CHM 3410	Physical Chemistry I	.....5
CHM 3411	Physical Chemistry II	.....4
CHM 3740L	Advanced Laboratory Techniques	.....2
CHM 3741L	Physical Chemistry Laboratory	.....2
MCB 3020/L	Microbiology/Lab	.....4
PCB 3063/L	Genetics/Lab	.....4
	Advisor approved 3000/4000 level course	.....3

*If not completed at the Lower Division:*

CHM 2210/L	Organic Chemistry I/Lab	.....4
CHM 2211/L	Organic Chemistry II/Lab	.....4

**Major-Related (14-25 sh)**

* DEN 5121C	Biochemistry and Molecular Biology	.....4
* DEN 5200C	Dental Anatomy and Morphology	.....2
* DEN 5210	Oral Embryology	.....2
* DEN 5120	Principles of Physiology	.....6

\* Indicates courses taken at University of Florida College of Dentistry that apply to degree.

*If not completed at the Lower Division:*

DEP 2004	Human Development Across The Lifespan	.....3
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If not completed at the Lower Division, choose one option:

*Option 1*

PHY 2048/L	University Physics I/Lab	.....4
PHY 2049/L	University Physics II/Lab	.....4

*Option 2*

PHY 2053/L	General Physics I/Lab	.....4
PHY 2054/L	General Physics II/Lab	.....4

### Upper Division Electives (0-11 sh)

Sufficient 3000/4000 level electives to meet UWF's requirement of 48 semester hours in the upper division or completion of all departmental requirements at the 3000/4000 level, whichever is greater.

## BIOLOGICAL CHEMISTRY FAST TRACK BACHELORS/ MASTER'S SPECIALIZATION

This B.S./M.S. program is a 5-year (fast-track) program leading to a bachelor's degree in Chemistry and a master's degree in Biology with a specialization in Biological Chemistry. If students did not complete the admission foreign language in high school or community college, then they must complete it before receiving the bachelor's degree. During the first three years, students will satisfy the foundational requirements of the Chemistry/Biochemistry Specialization. In the fourth year students will complete most of the requirements for the B.S. degree and will begin graduate work and research in the Biological Chemistry Specialization within the M.S. program in Biology. The two degrees will be awarded concurrently upon completion of all requirements for the M.S. degree.

### General Studies (36 sh)

For additional information see the General Studies section of the *Catalog*.

### Common Prerequisites (32 sh)

Same as Chemistry/Biochemistry Specialization

### Lower Division Electives (0-5 sh)

Same as Chemistry/Biochemistry Specialization

### Major (39-47 sh)

BCH 3033/L	Biochemistry I/Lab	.....4
BCH 3034/L	General Biochemistry: Metabolism/Lab	.....4
CHM 3230	Organic Chemistry III	.....3
CHM 3410	Physical Chemistry I	.....5
CHM 3411	Physical Chemistry II	.....4
CHM 3740L	Advanced Laboratory Techniques	.....2
CHM 3741L	Physical Chemistry Laboratory	.....2
MCB 3020/L	Microbiology/Lab	.....4
PCB 3063/L	Genetics/Lab	.....4
PCB 3253/L	Developmental Biology/Lab	.....4
	Advisor approved 3000/4000 level course	.....3

If not completed at the lower division:

CHM 2210/L	Organic Chemistry I/Lab	.....0-4
CHM 2211/L	Organic Chemistry II/Lab	.....0-4

### Major-Related (21 sh)

If not completed at the lower division:

PHY 2048/L	University Physics I/Lab	.....0-4
PHY 2049/L	University Physics II/Lab	.....0-4

or

PHY 2053/L	General Physics I/Lab	.....0-4
PHY 2054/L	General Physics II/Lab	.....0-4

Students must complete all requirements for the MS in Biology (Biological Chemistry Specialization). Upon completion, up to 21 hours will be applied to the baccalaureate degree.

### Master's Requirements

See the Biological Chemistry Fast Track Specialization in the Biology listing of the Master's portion of this *Catalog*.

## BACHELOR OF ARTS

### CHEMISTRY, B.A.

The program is designed for students who need a strong background in chemistry for application in other fields. The tracks within this program are: business; pre-law; and education. Each track has the same core of chemistry courses and a set of required courses which depends on the area of concentration. The education track meets the American Chemical Society recommendations for a Chemistry/Education degree.

### General Studies (36 sh)

Same as Chemistry Bachelor of Science Specialization

### Common Prerequisites (24 sh)

Same as Chemistry Bachelor of Science Specialization

### Lower Division Electives (0-13 sh)

Same as Chemistry Bachelor of Science Specialization

### Major (24-32 sh)

CHM 3120/L	Analytical Chemistry/Lab	.....4
CHM 3400C	Basic Physical Chemistry	.....4
CHM 4611	Inorganic Chemistry	.....4

With departmental advisor approval, choose

12 semester hours of coursework from:

CHM 3230	Organic Chemistry III	.....3
CHM 3740L	Advanced Laboratory Techniques	.....2
CHM 4130/L	Instrumental Analysis/Lab	.....4
CHM 4455/L	Introduction to Polymer Science/Lab	.....3
CHM 4512	Computational Chemistry	.....3
CHM 4714C	Materials, Chemistry, and Engineering	.....3
CHM 4912	Undergraduate Chemistry Research	.....3
	Course offered 2-4 sh per semester	
CHM 4930	Seminar: Special Topics in	
	Advanced Chemistry	.....3-4
	Course offered 3-4 sh per semester	

If not completed at lower division:

CHM 2210/L	Organic Chemistry I/Lab	.....0-4
CHM 2211/L	Organic Chemistry II/Lab	.....0-4

**Major-Related (12-27 sh)**

Choose one of the following Options:

**Business Option (18-19 sh)**

GEB 3032	Business Foundations for Non-Business Majors .....	3
MAR 4403	Sales Management .....	3
MAR 4701	Professional Selling Methods.....	3

Choose one:

STA 2023	Elements of Statistics .....	3
STA 3162C	Applied Statistics .....	4

Choose two:

ACG 3082	Accounting for Non-majors.....	3
ECO 3003	Principles of Economic Theory and Public Policy .....	3
MAN 3025	Management Fundamentals .....	3

**Pre-Law Option (15 sh)**

CJL 3510	Judicial Process .....	3
PLA 4263	Evidence.....	3
PLA 4308	Criminal Procedure .....	3

Choose two:

EVR 4035	Environmental Law.....	3
PLA 3103	Legal Research and Writing.....	3
PLA 4201	Civil Litigation I .....	3
PLA 4273	Tort Law .....	3
PLA 4304	Criminal Law .....	3

**Education Option (12-14 sh)**

EDG 4048	Contemporary Issues in Public Education .....	1-3
ESE 4322	Instruction, Management and Assessment: Secondary Education .....	3
ESE 4323	Educational Assessment .....	3
ESE 4940	ESOL/Reading Professional Practicum II .....	3
	Course offered 1-3 sh per semester	
SCE 4320	Teaching Science in Middle and Secondary Schools .....	2

**All Options (0-8 sh):**

If not completed in the lower division

PHY 2048/L	University Physics I/Lab .....	0-4
PHY 2049/L	University Physics II/Lab.....	0-4

or

PHY 2053/L	General Physics I/Lab.....	0-4
PHY 2054/L	General Physics II/Lab .....	0-4

**Upper-Division Electives (9-24 sh)**

Sufficient 3000/4000 level electives to meet UWF's requirement of 48 semester hours in the upper division or completion of all departmental requirements at the 3000/4000 level, whichever is greater.

**CHEMISTRY/BIOCHEMISTRY B.A.**

The program is designed for students who need a strong background in chemistry/biochemistry for application in other fields. The tracks within this program are: Environmental, Forensics, and Pre-medical. Each track has the same core of chemistry courses and a set of required courses which depends on the area of concentration. The pre-medical track prepares students for admission to medical, dental, and pharmacy schools while providing the broad based education preferred by these institutions.

**General Studies (36 sh)**

Same as Chemistry/Biochemistry Bachelor of Science Specialization

**Common Prerequisites (32 sh)**

Same as Chemistry/Biochemistry Bachelor of Science Specialization

**Lower Division Electives (0-5 sh)**

Same as Chemistry/Biochemistry Bachelor of Science Specialization

**Major (24-32 sh)**

CHM 3120/L	Analytical Chemistry/Lab .....	4
CHM 3400C	Basic Physical Chemistry.....	4
CHM 4611	Inorganic Chemistry .....	4

With departmental advisor approval, choose 12 semester hours of coursework from:

CHM 3230	Organic Chemistry III .....	3
CHM 3740L	Advanced Laboratory Techniques .....	2
CHM 4130/L	Instrumental Analysis/Lab .....	4
CHM 4455/L	Introduction to Polymer Science/Lab .....	3
CHM 4512	Computational Chemistry.....	3
CHM 4714C	Materials, Chemistry, and Engineering .....	3
CHM 4912	Undergraduate Chemistry Research .....	3
	Course offered 2-4 sh per semester	
CHM 4930	Seminar: Special Topics in Advanced Chemistry .....	3
	Course offered 3-4 sh per semester	

Note. Forensics track requires CHM 3740L or CHM 4130/L.

**All Options (0-8 sh):**

If not completed in the lower division

CHM 2210/L	Organic Chemistry I/Lab .....	0-4
CHM 2211/L	Organic Chemistry II/Lab .....	0-4

**Major-Related (15-27 sh)**

Choose one of the following options:

**Environmental Option (19 sh)**

GEO 3260/L	Geography of Soils/Lab .....	4
GEO 4280/L	Basic Hydrology/Lab .....	4
GLY 2010/L	Physical Geology/Lab .....	4
GLY 3031C	Environmental Geology .....	4

*Choose one:*

EVR 4035	Environmental Law.....	3
EVR 4037	Environmental Auditing(preferred) .....	3

**Pre-Medical Option (17-18 sh)**

ENC 3250	Professional Writing .....	3
PHI 4633	Biomedical Ethics.....	3

*Choose three:*

BCH 3034/L	General Biochemistry: Metabolism/Lab .....	4
MCB 3020/L	Microbiology/Lab .....	4
PCB 3063/L	Genetics/Lab .....	4
PCB 4703	Human Physiology .....	3

**Forensic Sciences Option (15 sh)**

CCJ 3024	The American Criminal Justice System .....	3
CCJ 4239	Criminal Investigation.....	3
PLA 4263	Evidence.....	3

*Choose two:*

CCJ 3014	Criminology .....	3
CCJ 3060	Moral Issues in Criminal Justice .....	3
CCJ 4036	Behavioral Science and the Law .....	3
CJE 3670	Introduction to Forensic Sciences .....	3
PLA 4308	Criminal Procedure .....	3

**All Options**

*If not completed at the lower level choose one option:*

*Option 1*

PHY 2048/L	University Physics I/Lab .....	0-4
PHY 2049/L	University Physics II/Lab.....	0-4

*Option 2*

PHY 2053/L	General Physics I/Lab.....	0-4
PHY 2054/L	General Physics II/Lab .....	0-4

**Upper-Division Electives (9-21 sh)**

Sufficient 3000/4000 level electives to meet UWF's requirement of 48 semester hours in the upper division or completion of all departmental requirements at the 3000/4000 level, whichever is greater.

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**MINOR**

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The Minor in Chemistry is designed for students majoring in other science disciplines. Chemistry majors may not earn this minor. The following requirements must be completed.

CHM 2045/L	General Chemistry I/Lab .....	4
CHM 2046/L	General Chemistry II/Lab .....	4
CHM 2210/L	Organic Chemistry I .....	4
CHM 2211/L	Organic Chemistry II .....	4
CHM 3120/L	Analytical Chemistry/Lab .....	4
CHM 3400C	Basic Physical Chemistry.....	4
CHM 4611	Inorganic Chemistry .....	4
MAC 2311	Analytic Geometry and Calculus I .....	4
MAC 2312	Analytic Geometry and Calculus II.....	4
Advisor approved 3000/4000 level course .....		3-4

*Choose one option:**Option 1:*

PHY 2048/L	University Physics I .....	4
PHY 2049/L	University Physics II.....	4

*Option 2:*

PHY 2053/L	General Physics I.....	4
PHY 2054/L	General Physics II .....	4

Note: Changes to the Chemistry Minor have been proposed by the department and are pending Faculty Senate and University approval. Approval is expected before the beginning of the academic year.