

# CHEMISTRY, B.S. (BEHREND)

**Begin Campus:** Any Penn State Campus

**End Campus:** Erie

## Suggested Academic Plan

The suggested academic plan(s) listed on this page are the plan(s) that are in effect during the 2024-25 academic year. To access previous years' suggested academic plans, please visit the archive (<https://bulletins.psu.edu/undergraduate/archive/>) to view the appropriate Undergraduate Bulletin edition.

### Professional Chemist Concentration: Chemistry, B.S. at Erie Campus

The course series listed below provides **only one** of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an **Academic Requirements** or **What If** report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

#### First Year

Fall	Credits Spring	Credits
PSU 7	1 CHEM 112*	3
CHEM 110*	3 CHEM 113*	1
CHEM 111*	1 MATH 141*††	4
MATH 140*††	4 PHYS 211*†	4
BIOL 110*†	4 General Education Course or ENGL 15‡	3
ENGL 15 (or General Education Course)‡	3 General Education Course	1.5
	<b>16</b>	<b>16.5</b>

#### Second Year

Fall	Credits Spring	Credits
CHEM 210*	3 CHEM 212*	3
CHEM 227*	4 CHEM 213*	2
MATH 230*	4 MATH 250 or STAT 401* <sup>1</sup>	3
PHYS 212*†	4 ENGL 202C††	3
General Education Course	1.5 General Education Course	3
	<b>16.5</b>	<b>14</b>

#### Third Year

Fall	Credits Spring	Credits
CHEM 358*	3 CHEM 440*	3
CHEM 450*	3 BMB 402* <sup>1</sup>	3
CHEM 451*	1 CHEM 441*	1
CHEM 472*	3 CHEM 452*	3
CAS 100‡	3 CHEM 453*	1
General Education Course	3 CHEM 494 or 495*	1
	Supporting Course	3
	<b>16</b>	<b>15</b>

#### Fourth Year

Fall	Credits Spring	Credits
CHEM 413*	4 CHEM 431W*	4

400-Level Chemistry Elective*	3 400-Level Chemistry Elective*	3
CHEM 494 or 495*	1 CHEM 494 or 495*	1
General Education Course	3 General Education Course	3
Supporting Course	3 Supporting Course	3
General Education Course	3	
	<b>17</b>	<b>14</b>

#### Total Credits 125

\* Course requires a grade of C or better for the major

‡ Course requires a grade of C or better for General Education

# Course is an Entrance to Major requirement

† Course satisfies General Education and degree requirement

<sup>1</sup> 3-credits from BMB 402, MATH 250 or STAT 401 are required. Additional credits from this will be used as a supporting course.

#### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy Cultural Diversity Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

General Education includes Foundations (GWS and GQ), Knowledge Domains (GHW, GN, GA, GH, GS) and Integrative Studies (Inter-domain) requirements. N or Q (Honors) is the suffix at the end of a course number used to help identify an Inter-domain course, but the inter-domain attribute is used to fill audit requirements. Foundations courses (GWS and GQ) require a grade of 'C' or better.

#### Program Notes:

- **Supporting Course List:** Students must take 12 credits of courses that are appropriate for a science major and on the school approved list. These include but are not limited to:
  - Additional 300- or 400-level chemistry courses beyond those required including up to 3 credits of CHEM 494/CHEM 495
  - BIOL 220W or higher
  - BMB 251 or higher
  - CMPEN
  - CMPSC 121 or higher
  - EDSGN 100S
  - ENVSC 200-level or higher
  - GEOG 100-level or higher
  - GEOSC 100-level or higher
  - Language courses 001-003 (e.g., CHNS, FR, GER, SPAN)
  - MATH 200-level or higher
  - MICRB 201 or higher
  - PHYS 213, PHYS 214, PHYS 237, or any 400-level
  - PLET 205 or higher
  - SOILS 100-level or higher
  - STAT 250 or higher
  - SWENG

## Biochemistry Concentration: Chemistry, B.S. at Erie Campus

The course series listed below provides **only one** of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an **Academic Requirements** or **What If** report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

Fall	Credits Spring	Credits
PSU 7	1 CHEM 112 <sup>*</sup>	3
CHEM 110 <sup>*</sup>	3 CHEM 113 <sup>*</sup>	1
CHEM 111 <sup>*</sup>	1 MATH 141 <sup>*†</sup>	4
MATH 140 <sup>*††</sup>	4 BIOL 230W	4
BIOL 110 <sup>*†</sup>	4 General Education Course or ENGL 15 <sup>‡</sup>	3
ENGL 15 (or General Education Course) <sup>‡</sup>	3 General Education Course	1.5
	<b>16</b>	<b>16.5</b>

### Second Year

Fall	Credits Spring	Credits
CHEM 210 <sup>*</sup>	3 CHEM 212 <sup>*</sup>	3
CHEM 227 <sup>*</sup>	4 CHEM 213 <sup>*</sup>	2
MATH 230 <sup>*</sup>	4 PHYS 212 <sup>*†</sup>	4
PHYS 211 <sup>*†</sup>	4 ENGL 202C <sup>††</sup>	3
General Education Course (GHW)	1.5 General Education Course	3
	<b>16.5</b>	<b>15</b>

### Third Year

Fall	Credits Spring	Credits
CHEM 358 <sup>*</sup>	3 CHEM 440 <sup>*</sup>	3
CHEM 450 <sup>*</sup>	3 CHEM 441 <sup>*</sup>	1
CHEM 451 <sup>*</sup>	1 CHEM 452 <sup>*</sup>	3
CHEM 472 <sup>*</sup>	3 CHEM 453 <sup>*</sup>	1
CAS 100 <sup>‡</sup>	3 CHEM 494 or 495 <sup>*</sup>	1
BIOL 322	3 BMB 402 <sup>*</sup>	3
	BMB 403	1
	General Education Course	3
	<b>16</b>	<b>16</b>

### Fourth Year

Fall	Credits Spring	Credits
CHEM 413 <sup>*</sup>	4 CHEM 431W <sup>*</sup>	4
400-Level Chemistry Elective <sup>*</sup>	3 400-Level Chemistry Elective <sup>*</sup>	3
CHEM 494 or 495 <sup>*</sup>	1 CHEM 494 or 495 <sup>*</sup>	1
General Education Course	3 General Education Course	3
BMB 406, BIOL 416, or MICRB 201	3 Supporting Course	3
General Education Course	3	
	<b>17</b>	<b>14</b>

**Total Credits 127**

\* Course requires a grade of C or better for the major

‡ Course requires a grade of C or better for General Education

# Course is an Entrance to Major requirement

† Course satisfies General Education and degree requirement

### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy Cultural Diversity Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

General Education includes Foundations (GWS and GQ), Knowledge Domains (GHW, GN, GA, GH, GS) and Integrative Studies (Inter-domain) requirements. N or Q (Honors) is the suffix at the end of a course number used to help identify an Inter-domain course, but the inter-domain attribute is used to fill audit requirements. Foundations courses (GWS and GQ) require a grade of 'C' or better.

### Program Notes:

- The CHMBC degree requires MATH 250, STAT 401, or BMB 402 and 12 credits of Supporting Courses. For a student interested in a concentration in Biochemistry, they are advised to take BMB 402, BMB 403, BIOL 230W, BIOL 322, BMB 406 or BIOL 416 or MICRB 201, plus one additional Supporting Course of their choice to fulfill these requirements.
- Students who choose to take either BIOL 220W or BIOL 230W as their additional supporting course will qualify for a minor in biology.
- Supporting Course List:** Students must take 12 credits of courses that are appropriate for a science major and on the school approved list. These include but are not limited to:
  - Additional 300- or 400-level chemistry courses beyond those required including up to 3 credits of CHEM 494/CHEM 495
  - BIOL 220W or higher
  - BMB 251 or higher
  - CMPEN
  - CMPSC 121 or higher
  - EDSGN 100S
  - ENVSC 200-level or higher
  - GEOG 100-level or higher
  - GEOSC 100-level or higher
  - Language courses 001-003 (e.g., CHNS, FR, GER, SPAN)
  - MATH 200-level or higher
  - MICRB 201 or higher
  - PHYS 213, PHYS 214, PHYS 237, or any 400-level
  - PLET 205 or higher
  - SOILS 100-level or higher
  - STAT 250 or higher
  - SWENG

## Environmental Concentration: Chemistry, B.S. at Erie Campus

The course series listed below provides **only one** of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an **Academic Requirements** or **What If** report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

Fall	Credits Spring	Credits
PSU 7	1 CHEM 112*	3
CHEM 110*	3 CHEM 113*	1
CHEM 111*	1 MATH 141**†	4
MATH 140**†	4 PHYS 211**	4
BIOL 110**	4 General Education Course (GA/GH/GS) or ENGL 15‡	3
ENGL 15 (or General Education Course (GA/GH/GS))‡	3 General Education Course (GHW)	1.5
	<b>16</b>	<b>16.5</b>

### Second Year

Fall	Credits Spring	Credits
CHEM 210*	3 CHEM 212*	3
CHEM 227*	4 CHEM 213*	2
MATH 230*	4 PHYS 212**	4
BIOL 220W	4 ENGL 202C**	3
General Education Course (GA/GH/GS)	3 STAT 401	3
	<b>18</b>	<b>15</b>

### Third Year

Fall	Credits Spring	Credits
CHEM 358*	3 CHEM 440*	3
CHEM 450*	3 CHEM 441*	1
CHEM 451*	1 CHEM 452*	3
CHEM 472*	3 CHEM 453*	1
MICRB 201	3 CHEM 494 or 495*	1
MICRB 202	2 CAS 100‡	3
	General Education Course (GA/GH/GS)	3
	<b>15</b>	<b>15</b>

### Fourth Year

Fall	Credits Spring	Credits
CHEM 413*	4 CHEM 431W*	4
400-Level Chemistry Elective*	3 400-Level Chemistry Elective*	3
CHEM 494 or 495*	1 CHEM 494 or 495*	1
General Education Course (GA/GH/GS) or CHEM 301	3 GEOSC 418	3
General Education Course (GA/GH/GS)	3 General Education Course (GA/GH/GS)	3

General Education Course (GA/GH/GS)	3 General Education Course (GHW)	1.5
	<b>17</b>	<b>15.5</b>

### Total Credits 128

- \* Course requires a grade of C or better for the major
- ‡ Course requires a grade of C or better for General Education
- # Course is an Entrance to Major requirement
- † Course satisfies General Education and degree requirement

### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy Cultural Diversity Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

General Education includes Foundations (GWS and GQ), Knowledge Domains (GHW, GN, GA, GH, GS) and Integrative Studies (Inter-domain) requirements. N or Q (Honors) is the suffix at the end of a course number used to help identify an Inter-domain course, but the inter-domain attribute is used to fill audit requirements. Foundations courses (GWS and GQ) require a grade of 'C' or better.

### Program Notes:

- The CHMBC degree requires MATH 250, STAT 401, or BMB 402 and 12 credits of Supporting Courses. For a student interested in an Environmental Concentration, they are advised to take STAT 401, BIOL 220W, MICRB 201, MICRB 202, CHEM 301 or CHEM 297 (Biogeochemistry, which does not yet have a permanent course number) and GEOSC 418 to fulfill these requirements.
- **Supporting Course List:** Students must take 12 credits of courses that are appropriate for a science major and on the school approved list. These include but are not limited to:
  - Additional 300- or 400-level chemistry courses beyond those required including up to 3 credits of CHEM 494/CHEM 495
  - BIOL 220W or higher
  - BMB 251 or higher
  - CMPEN
  - CMPSC 121 or higher
  - EDSGN 100S
  - ENVSC 200-level or higher
  - GEOG 100-level or higher
  - GEOSC 100-level or higher
  - Language courses 001-003 (e.g., CHNS, FR, GER, SPAN)
  - MATH 200-level or higher
  - MICRB 201 or higher
  - PHYS 213, PHYS 214, PHYS 237, or any 400-level
  - PLET 205 or higher
  - SOILS 100-level or higher
  - STAT 250 or higher
  - SWENG

## Pre-Health Concentration: Chemistry, B.S. at Erie Campus

The course series listed below provides **only one** of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an **Academic Requirements** or **What If** report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

### First Year

Fall	Credits Spring	Credits
PSU 7	1 CHEM 112*	3
CHEM 110*	3 CHEM 113*	1
CHEM 111*	1 MATH 141*†	4
MATH 140*††	4 BIOL 230W	4
BIOL 110*†	4 General Education Course (GA/GH/GS) or ENGL 15‡	3
ENGL 15 (or General Education Course (GA/GH/GS))‡	3 NUTR 251	3
	<b>16</b>	<b>18</b>

### Second Year

Fall	Credits Spring	Credits
CHEM 210*	3 CHEM 212*	3
CHEM 227*	4 CHEM 213*	2
MATH 230*	4 PHYS 211*†	4
BIOL 240W	4 ENGL 202C††	3
SC 201	1 PSYCH 100 or SOC 1 (GS)	3
	<b>16</b>	<b>15</b>

### Third Year

Fall	Credits Spring	Credits
CHEM 358*	3 CHEM 440*	3
CHEM 450*	3 CHEM 441*	1
CHEM 451*	1 CHEM 452*	3
CHEM 472*	3 CHEM 453*	1
CAS 100‡	3 CHEM 494 or 495*	1
PHYS 212*†	4 BMB 402*	3
	BIOL 472	3
	<b>17</b>	<b>15</b>

### Fourth Year

Fall	Credits Spring	Credits
CHEM 413*	4 CHEM 431W*	4
400-Level Chemistry Elective*	3 400-Level Chemistry Elective*	3
CHEM 494 or 495*	1 CHEM 494 or 495*	1
BIOL 497 or MICRB 201	3-4 General Education Course (GA/GH/GS)	3
General Education Course (GA/GH/GS)	3 General Education Course (GA/GH/GS)	3
General Education Course (GA/GH/GS)	3	
	<b>17-18</b>	<b>14</b>

**Total Credits 128-129**

\* Course requires a grade of C or better for the major

‡ Course requires a grade of C or better for General Education

# Course is an Entrance to Major requirement

† Course satisfies General Education and degree requirement

### University Requirements and General Education Notes:

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W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

General Education includes Foundations (GWS and GQ), Knowledge Domains (GHW, GN, GA, GH, GS) and Integrative Studies (Inter-domain) requirements. N or Q (Honors) is the suffix at the end of a course number used to help identify an Inter-domain course, but the inter-domain attribute is used to fill audit requirements. Foundations courses (GWS and GQ) require a grade of 'C' or better.

### Program Notes:

- The CHMBC degree requires MATH 250, STAT 401, or BMB 402 and 12 credits of Supporting Courses. For a student interested in a concentration in Pre-Health, they are advised to take BMB 402, BIOL 230W, BIOL 240W, BIOL 472, and either BIOL 497 (if interested in medical profession) or MICRB 201 (if interested in pharmacy) to fulfill these requirements. A student interested in attending medical school should consider taking MICRB 201 in addition to BIOL 497 and are advised to discuss this with their adviser. Students will qualify for a minor in biology with these courses.
- Students interested in pre-health careers are advised to take either PSYCH 100 and/or SOC 1 in order to fulfill the GS general education requirement and NUTR 251 to fulfill the GHW general education requirement.
- Supporting Course List:** Students must take 12 credits of courses that are appropriate for a science major and on the school approved list. These include but are not limited to:
  - Additional 300- or 400-level chemistry courses beyond those required including up to 3 credits of CHEM 494/CHEM 495
  - BIOL 220W or higher
  - BMB 251 or higher
  - CMPEN
  - CMPSC 121 or higher
  - EDSGN 100S
  - ENVSC 200-level or higher
  - GEOG 100-level or higher
  - GEOSC 100-level or higher
  - Language courses 001-003 (e.g., CHNS, FR, GER, SPAN)
  - MATH 200-level or higher
  - MICRB 201 or higher
  - PHYS 213, PHYS 214, PHYS 237, or any 400-level
  - PLET 205 or higher
  - SOILS 100-level or higher
  - STAT 250 or higher
  - SWENG



## all options: Chemistry, B.S. at commonwealth Campuses

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### First Year

Fall	Credits Spring	Credits
First Year Seminar	1 CHEM 112*	3
CHEM 110*	3 CHEM 113*	1
CHEM 111*	1 MATH 141**†	4
MATH 140**†	4 PHYS 211**†	4
BIOL 110**†	4 ENGL 15 (or General Education Course)†	3
ENGL 15 (or General Education Course)†	3 General Education Course	1.5
	<b>16</b>	<b>16.5</b>

### Second Year

Fall	Credits Spring	Credits
CHEM 210*	3 CHEM 212*	3
CAS 100†	3 CHEM 213*	2
MATH 230*	4 MATH 250 or STAT 401* <sup>1</sup>	3
PHYS 212**†	4 ENGL 202C††	3
General Education Course	1.5 General Education Course	3
	<b>15.5</b>	<b>14</b>

### Third Year

Fall	Credits Spring	Credits
CHEM 227*	4 CHEM 440*	3
CHEM 358*	3 CHEM 441*	1
CHEM 450*	3 CHEM 452*	3
CHEM 451*	1 CHEM 453*	1
General Education Course	3 CHEM 494 or 495*	1
General Education Course	3 BMB 402**†	3
	Supporting Course	3
	<b>17</b>	<b>15</b>

### Fourth Year

Fall	Credits Spring	Credits
CHEM 413*	4 CHEM 431W*	4
CHEM 472*	3 400-Level Chemistry Elective*	3
CHEM 494 or 495*	1 CHEM 494 or 495*	1
General Education Course	3 General Education Course	3
Supporting Course	3 Supporting Course	3
400-Level Chemistry Elective*	3	
	<b>17</b>	<b>14</b>

**Total Credits 125**

\* Course requires a grade of C or better for the major

‡ Course requires a grade of C or better for General Education

# Course is an Entrance to Major requirement

† Course satisfies General Education and degree requirement

<sup>1</sup> 3 credits from BMB 402, MATH 250 or STAT 401 are required. Additional credits from this list will be used as a supporting course.

### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy Cultural Diversity Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

General Education includes Foundations (GWS and GQ), Knowledge Domains (GHW, GN, GA, GH, GS) and Integrative Studies (Inter-domain) requirements. N or Q (Honors) is the suffix at the end of a course number used to help identify an Inter-domain course, but the inter-domain attribute is used to fill audit requirements. Foundations courses (GWS and GQ) require a grade of 'C' or better.

### Program Notes:

- **Supporting Course List:** Students must take 12 credits of courses that are appropriate for a science major and on the school approved list. These include but are not limited to:
  - Additional 300- or 400-level chemistry courses beyond those required including up to 3 credits of CHEM 494/CHEM 495
  - BIOL 220W or higher
  - BMB 251 or higher
  - CMPEN
  - CMPSC 121 or higher
  - EDSGN 100S
  - ENVSC 200-level or higher
  - GEOG 100-level or higher
  - GEOSC 100-level or higher
  - Language courses 001 – 003 (e.g., CHNS, FR, GER, SPAN)
  - MATH 200-level or higher
  - MICRB 201 or higher
  - PHYS 213, PHYS 214, PHYS 237, or any 400-level
  - PLET 205 or higher
  - SOILS 100-level or higher
  - STAT 250 or higher
  - SWENG