BIOCHEMISTRY 3+2 PLAN, JOINT BACHELOR OF SCIENCE/MASTER OF SCIENCE

Biochemistry 3+2 Plan (BS/MS)

A feature of the Biochemistry MS program is the 3+2 plan. This plan gives qualified undergraduate students the opportunity to simultaneously pursue both the Baccalaureate (BS) and Master of Science (MS) degrees. Talented students are thus quickly moved toward expanding their academic and scientific horizons based on individual student's abilities and motivation.

Specific requirements for the 3+2 program are included in the Biochemistry MS description of the College of Science, Technology, Engineering, and Mathematics, undergraduate programs section of this catalog. Students are encouraged to enter the program as early as the fall of the junior year but not later than the fall of the senior year.

Specific Admission Requirements

Students in the 3+2 program are expected to successfully complete the requirements for both the BS and MS degree in five academic years. This is shorter than the typical six years that are necessary to complete BS and MS programs independently. Students must apply to the 3+2 program during the Spring semester of their junior year or the Fall semester of their senior year and meet the course requirements listed below. Students applying to the 3+2 program must have a minimum 3.0 overall GPA and a minimum 3.25 GPA in their chemistry courses.

Prior to being admitted to the Biochemistry 3+2 program, students much have completed or be in process of completing the following courses:

Course	Title	Credits
CHEM 121	General Chemistry I (GT-SC2)	4
CHEM 121L	General Chemistry Lab I (GT-SC1)	1
CHEM 122	General Chemistry II (GT-SC2)	4
CHEM 122L	General Chemistry Lab II (GT-SC1)	1
CHEM 301	Organic Chemistry I	3
CHEM 301L	Organic Chemistry Lab I	2
CHEM 302	Organic Chemistry II	3
CHEM 302L	Organic Chemistry Lab II	2
CHEM 311	Biochemistry Survey	3
or CHEM 411	Biochemistry I	
CHEM 317	Quantitative Analysis	3
CHEM 317L	Quantitative Analysis Lab	2
CHEM 321	Physical Chemistry I	3
CHEM 322	Physical Chemistry II	3

The application file for admission to the Biochemistry 3+2 plan must include:

1. A completed Biochemistry MS application form (online);
2. A letter of intent explaining your expectations and purpose for obtaining the MS in Biochemistry;
3. Current CSU Pueblo transcript documenting an undergraduate GPA or 3.00 overall and 3.25 in chemistry courses; and
4. Three letters of recommendation from CSU Pueblo faculty addressing your qualifications and potential to succeed in the program.

Specific Program Requirements

Students in the 3+2 BS/MS program must complete:

- The requirements for a BS in Biochemistry.
- The requirements for the MS in Biochemistry including thesis or non-thesis options.

It is expected that students take any 400/500 level courses at the 500 level once they are enrolled in the 3+2 program plan.

The 3+2 degree plan has the following requirements:

Course	Title	Credits
General Education		24
BS Chemistry Core		42
BS Biochemistry Concentration		54
MS Biochemistry		30-32
Total Credits		**150-152**

Undergraduate Requirements

Specific Core Requirements

Course	Title	Credits
CHEM 121 & 121L	General Chemistry I (GT-SC2) and General Chemistry Lab I (GT-SC1)	5
CHEM 122 & 122L	General Chemistry II (GT-SC2) and General Chemistry Lab II (GT-SC1)	5
CHEM 170	Academic Orientation	0.5
CHEM 301 & 301L	Organic Chemistry I and Organic Chemistry Lab I	5
CHEM 302 & 302L	Organic Chemistry II and Organic Chemistry Lab II	5
CHEM 317 & 317L	Quantitative Analysis and Quantitative Analysis Lab	5
CHEM 321	Physical Chemistry I	3
CHEM 322	Physical Chemistry II	3
CHEM 370	Academic Enrichment	0.5
CHEM 419 & 419L	Instrumental Analysis and Instrumental Analysis Lab	5
CHEM 420 & 420L	Inorganic Chemistry and Inorganic Chemistry Lab	4
CHEM 493	Seminar	1
Total Credits		**42**

Specific Concentration Requirements

Course	Title	Credits
CHEM 411	Biochemistry I	3
CHEM 412 & 412L	Biochemistry II and Biochemistry II Lab	5
Electives		**3**
CHEM 492	Research	1-3
CHEM 495	Independent Study	1-7
Other Required Courses		

BIOL 181 & 181L	College Biology I/Organismal Bio (GT-SC2) and College Biology I/Organismal Bio Lab (GT-SC1)	4
BIOL 182 & 182L	College Biology II/Cellular Biology (GT-SC2) and College Biology II/Cellular Bio Lab (GT-SC1)	4
BIOL 301 & 301L	General Microbiology and General Microbiology Lab	5
BIOL 350	Mendelian and Population Genetics	2
BIOL 351 & 351L	Molecular Biology & Genetics and Molecular Biology & Genetics Laboratory	4
BIOL 412 & 412L	Advanced Cellular Biology and Advanced Cellular Biology Lab	4
MATH 126	Calculus & Analytic Geometry I (GT-MA1)	5
MATH 224	Calculus and Analytic Geometry II	5
PHYS 221 & 221L	General Physics I and General Physics I Lab (GT-SC1)	5
PHYS 222 & 222L	General Physics II and General Physics II Lab (GT-SC1)	5
Total Credits		**54**

Graduate Requirements

The course of study requires five semester credits of course work common to all students. Each student must complete three of the five core courses (9 credit hours). Students are required to complete 10-12 additional credit hours of approved graduate level electives in Chemistry, Biology, Math, or Engineering as outlined in the graduation plan developed with the student's advisor and graduate committee, and approved by the Program Director. The signed graduation plan may be completed at any time, but is a requirement for successful completion of CHEM 510 Seminar (3 c.h.).

Thesis option students are required to defend their research results before their graduate committee. Non-thesis option students must take a written comprehensive examination over courses taken in their program of study. A non-thesis option student must submit a formal written report based on an internship and defend their internship and work before their graduate committee.

Each student must pass qualifying exams in three of five areas of selected chemistry content (analytical, biological, inorganic, organic, or physical chemistry). Students will have two opportunities to pass each area exam. Qualifier examinations are scheduled during the week preceding the beginning of classes each term or in consultation with the program director or department chair. If an examination is failed, the requirement may be satisfied by completing the designated undergraduate coursework in the appropriate subdiscipline, as specified by the program director or department chair, with a minimum grade of "B".Students enrolling into the 3+2 program will be exempt from the requirement to pass qualifying exams if they have completed courses at CSU Pueblo in analytical, biological, inorganic, organic, or physical chemistry with a grade of "B" or better.Students enrolled in the 3+2 program required to pass qualifying exams will schedule the exams in consultation with the Program Director.

Course	Title	Credits
Select three of the following:		**9**
CHEM 501	Advanced Organic Chemistry	3
CHEM 511 or CHEM 512	Biochemistry I Biochemistry II	3
CHEM 521	Advanced Inorganic Chemistry	3
CHEM 529	Advanced Analytical Chemistry	3
CHEM 531	Advanced Physical Chemistry	3
Total Credits		**9**

Plan A (Thesis Option)

Course	Title	Credits
Thesis Option Courses		**11**
CHEM 510	Foundations in Graduate Studies	3
CHEM 589	Thesis Defense	1
CHEM 593	Seminar	1
CHEM 599	Thesis Research	6
Electives		**10**
Total Credits		**21**

Plan B (Non-Thesis Option)

Course	Title	Credits
Non-Thesis Option Courses		**9**
CHEM 510	Foundations in Graduate Studies	3
CHEM 588	Internship Defense	1
CHEM 593	Seminar	1
CHEM 598	Internship	4
Electives		**14**
Total Credits		**23**

Electives

Elective courses may be selected from the following or others may be added with permission of the Graduate Committee.

Course	Title	Credits
CHEM 501 & 501L	Advanced Organic Chemistry and Advanced Organic Chemistry Lab	5
CHEM 503	Polymer Chemistry	3
CHEM 511	Biochemistry I	3
CHEM 512 & 512L	Biochemistry II and Biochemistry II Lab	5
CHEM 519 & 519L	Instrumental Analysis and Instrumental Analysis Lab	5
CHEM 521	Advanced Inorganic Chemistry	3
CHEM 525	Environmental Chemistry	3
CHEM 529	Advanced Analytical Chemistry	3
CHEM 531	Advanced Physical Chemistry	3
CHEM 550	Industrial Chemistry	2
CHEM 591	Special Topics	1-4
CHEM 592	Research	1-6
CHEM 595	Independent Study	1-4

Planning Sheet

Disclaimer: The Planning Sheet is designed as a guide for student's planning their course selections. The information on this page provides only a suggested schedule. Actual course selections should be made with the advice and consent of an academic advisor. While accurately portraying the information contained in the college catalog, this form is not considered a legal substitute for that document. Students should

become familiar with the catalog in effect at the time in which they entered the institution.

Enrollment in CHEM 121 requires successful placement exam score or completion of CHEM 111 with a grade of C or better, and completion of MATH 120 with a grade of C or better, or mathematics placement above MATH 120. The placement exam is administered through the Testing Center - contact them to make arrangements.

Thesis Option

Course	Title	Credits
Year 1		
Fall		
CHEM 121	General Chemistry I (GT-SC2)	4
CHEM 121L	General Chemistry Lab I (GT-SC1)	1
CHEM 170	Academic Orientation	0.5
MATH 126	Calculus & Analytic Geometry I (GT-MA1)	5
ENG 101	Rhetoric & Writing I (GT-CO1)	3
General Education	recommended to select a Humanities course	3
	Credits	**16.5**
Spring		
CHEM 122	General Chemistry II (GT-SC2)	4
CHEM 122L	General Chemistry Lab II (GT-SC1)	1
MATH 224	Calculus and Analytic Geometry II	5
ENG 117 or ENG 115	Intro. Scientific/Medical Writing (GT-CO2) or ENG 102 or Intro Tech Prof Writing GT-CO2	3
General Education	recommended to select a Social Science course	3
	Credits	**16**
Year 2		
Fall		
CHEM 301	Organic Chemistry I	3
CHEM 301L	Organic Chemistry Lab I	2
CHEM 292	Research	1
BIOL 181	College Biology I/Organismal Bio (GT-SC2)	3
BIOL 181L	College Biology I/Organismal Bio Lab (GT-SC1)	1
PHYS 221	General Physics I	4
PHYS 221L	General Physics I Lab (GT-SC1)	1
	Credits	**15**
Spring		
CHEM 302	Organic Chemistry II	3
CHEM 302L	Organic Chemistry Lab II	2
CHEM 292	Research	1
BIOL 182	College Biology II/Cellular Biology (GT-SC2)	3
BIOL 182L	College Biology II/Cellular Bio Lab (GT-SC1)	1
PHYS 222	General Physics II	4
PHYS 222L	General Physics II Lab (GT-SC1)	1
	Credits	**15**
Year 3		
Fall		
CHEM 317	Quantitative Analysis	3
CHEM 317L	Quantitative Analysis Lab	2
CHEM 322	Physical Chemistry II	3
CHEM 492	Research	1
BIOL 301L	General Microbiology Lab	2
BIOL 301	General Microbiology	3
BIOL 350	Mendelian and Population Genetics	2
	Credits	**16**
Spring		
CHEM 321	Physical Chemistry I	3
CHEM 370	Academic Enrichment	0.5
CHEM 519	Instrumental Analysis	3
CHEM 519L	Instrumental Analysis Lab	2
CHEM 599	Thesis Research	1
BIOL 351	Molecular Biology & Genetics	3
BIOL 351L	Molecular Biology & Genetics Laboratory	2
	Credits	**14.5**
Year 4		
Fall		
CHEM 420	Inorganic Chemistry	3
CHEM 420L	Inorganic Chemistry Lab	1
CHEM 510	Foundations in Graduate Studies	3
CHEM 511	Biochemistry I	3
CHEM 599	Thesis Research	1
CHEM Elective		3
General Education	recommended to select a Social Science course	3
	Credits	**17**
Spring		
CHEM 512	Biochemistry II	3
CHEM 512L	Biochemistry II Lab	2
CHEM 521	Advanced Inorganic Chemistry	3
CHEM 599	Thesis Research	1
CHEM Elective		3
BIOL 512	Advanced Cellular Biology	3
BIOL 512L	Advanced Cellular Biology Lab	1
	Credits	**16**
	Total Credits	**126**

Year 5

Course	Title	Credits
Year 4		
Fall		
CHEM 593	Seminar	1
CHEM 599	Thesis Research	2
General Education	recommended to select a Humanities course	3
Elective		3
Elective		3
	Credits	**12**
Spring		
CHEM 589	Thesis Defense	1
CHEM 599	Thesis Research	1
General Education	recommended to select a History course	3
General Education	recommended to select a Humanities course	3
Elective		4
	Credits	**12**
	Total Credits	**24**

Non-Thesis Option

Follow years 1 and 2 in Thesis Option, then continue below.

Course	Title	Credits
Year 3		
Fall		
CHEM 317	Quantitative Analysis	3
CHEM 317L	Quantitative Analysis Lab	2
CHEM 322	Physical Chemistry II	3
BIOL 301	General Microbiology	3
BIOL 301L	General Microbiology Lab	2
BIOL 350	Mendelian and Population Genetics	2
	Credits	**15**
Spring		
CHEM 321	Physical Chemistry I	3
CHEM 370	Academic Enrichment	0.5

CHEM 419	Instrumental Analysis select CHEM 519 if accepted to 3+2 program	3
CHEM 419L	Instrumental Analysis Lab select CHEM 519L if accepted to 3+2 program	2
BIOL 351	Molecular Biology & Genetics	3
BIOL 351L	Molecular Biology & Genetics Laboratory	2
	Credits	**13.5**
Year 4		
Fall		
CHEM 420	Inorganic Chemistry	3
CHEM 420L	Inorganic Chemistry Lab	1
CHEM 510	Foundations in Graduate Studies	3
CHEM 511	Biochemistry I	3
CHEM 598	Internship	1
CHEM Elective		3
General Education recommended to select a Social Science course		3
	Credits	**17**
Spring		
CHEM 512	Biochemistry II	3
CHEM 512L	Biochemistry II Lab	2
CHEM 521	Advanced Inorganic Chemistry	3
CHEM Elective		3
BIOL 512	Advanced Cellular Biology	3
BIOL 512L	Advanced Cellular Biology Lab	1
chem 598		1
	Credits	**16**
	Total Credits	**61.5**

Year 5

Course	Title	Credits
Year 4		
Fall		
CHEM 593	Seminar	1
CHEM 598	Internship	2
General Education recommended to select a Humanities course		3
Elective		4
Elective		3
	Credits	**13**
Spring		
CHEM 588	Internship Defense	1
General Education recommended to select a History course		3
General Education recommended to select a Humanities course		3
Elective		4
Elective		3
	Credits	**14**
	Total Credits	**27**