

Canisius College
Department of Chemistry & Biochemistry
Student Handbook
2019–2020



Rev July 2019

A copy of this handbook can be downloaded from
<https://www.canisius.edu/academics/programs/chemistry-and-biochemistry/student-handbook>

AY 19/20

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Welcome to the Department of Chemistry & Biochemistry at Canisius College!

Inside these pages you will find information about:

- How to declare a major or minor
- Chemistry & Biochemistry Tracks including course requirements and recommended schedules
- Careers suitable for Chemistry & Biochemistry majors
- Extracurricular activities in the sciences
- Faculty and their research
- Important information for students interested in obtaining advanced degrees in Chemistry and Biochemistry (MS & PhD) after graduation
- Important information for students interested in attending medical or dental school after graduation
- Important information for students interested in attending pharmacy school after graduation

We hope that you find this information helpful and that you enjoy your studies here at Canisius. If you have any questions, please seek out a faculty member. We're excited that you are a member of our department and can't wait to watch you succeed!

The Chemistry & Biochemistry Department Faculty & Staff

Phillip Sheridan, Chair (Physical)
Timothy Gregg (Organic)
Mariusz Kozik (Inorganic)
Mary O'Sullivan (Organic)
Jaime Sheridan (Lab Director)
Alice Steltermann (Adm. Assoc.)

Allyson Backstrom (Organic)
Roberto Gregorius (Science Education)
Krit Marohn (General Chemistry Labs)
Peter Schaber (Analytical)
Jeremy Steinbacher (Organic)
Steven Szczepankiewicz (Analytical)

Emeritus Faculty

Joseph Bieron

Declaring a Major or Minor in Chemistry or Biochemistry

All freshmen are asked to declare a major when they matriculate at Canisius College. If you declared Chemistry or Biochemistry as a major, then additional paperwork is NOT required.

If you would like to change your major to Chemistry or Biochemistry from another major, to declare a double or triple major, or to declare one or more minors, download the Majors & Minors Declaration Form from myCanisius (under Launchpad, then Forms). Please note that the signature of the Department Chair is required. Completed forms are then submitted to the Student Records Office, Bagen 106.

Note that the Chemistry and Biochemistry Department offers six degree tracks: three in chemistry (CHM ACS, CHM, CHM HT), two in biochemistry (BCH ACS, BCH), and Chemistry with Business. The differences between the tracks are summarized on the next page. When declaring a chemistry or biochemistry major you should indicate the track that you want to follow.

Side-by-side Comparison of Chemistry & Biochemistry Tracks (AY 19/20)

CHM ACS	CHM	CHM HT	CHM w BUS	BCH ACS	BCH
Cognate Courses					
BIO111 + L	BIO111 + L	BIO111 + L	BIO111 + L	BIO111 + L	BIO111 + L
		BIO112 + L	BIO112 + L	BIO112 + L	BIO112 + L
MAT111	MAT111	MAT111	MAT111	MAT111	MAT111
MAT112	MAT112/141	MAT112/141	MAT112/141	MAT112	MAT112/141
PHY223 (Calc based) + L	PHY201 + L	PHY201 + L	PHY201 + L	PHY223 + L	PHY201 + L
PHY224 (Calc based) + L	PHY202 + L	PHY202 + L	PHY202 + L	PHY224 + L	PHY202 + L
Introductory Chemistry					
CHM111 + L	CHM111 + L	CHM111 + L	CHM111 + L	CHM111 + L	CHM111 + L
CHM112 + L	CHM112 + L	CHM112 + L	CHM112 + L	CHM112 + L	CHM112 + L
Fundamental Courses					
Organic I CHM227 + L	CHM227 + L	CHM227 + L	CHM227 + L	CHM227 + L	CHM227 + L
Organic II CHM228 + L	CHM228 + L	CHM228 + L	CHM228 + L	CHM228 + L	CHM228 + L
Analytical CHM230 + L	CHM230 + L	CHM230 + L		CHM230 + L	
Inorganic CHM244	CHM244	CHM244		CHM244	CHM244
Fundamental Physical CHM301 + L	CHM301 + L	CHM301 (No L)	CHM301 (No L)	CHM301 + L	CHM301 (No L)
Intro to Bch BCH301 (No L)	BCH301 (No L)	BCH301 (No L)	BCH301 + L	BCH301 + L	BCH301 + L
In-depth Courses					
Modern Physical CHM302 + L				CHM302 + L	
		Cellular Bch BCH302		BCH302	BCH302
Spectroscopy CHM334 + L	CHM334 + L		(CHM230 or 232 or 334 or 430) + L	(CHM334 or 430) + L	(CHM334 or 430) + L
Instrumental CHM430 + L	CHM430 + L			Mol. Bio BIO450 + L	Mol. Bio BIO450 + L
				Materials CHM420	
Materials CHM420 + L					
CE or BCE	CE or BCE	CE or BCE + L	CE or BCE		CE or BCE or BE
CE or BCE	CE or BCE	SE + L			BCE or BE2
	CE or BCE	SE			
CHM 381,480,481	CHM 381,480,481	CHM 381,480,481	CHM 381,480	CHM 381,480,481	CHM 381,480,481
			Five Business Courses ¹		
			Two Major Electives ²		
Classes in Major and Laboratories					
20, 13L, 75 CR	19, 11L, 70 CR	19, 11L, 70 CR	22, 10L, 77 CR	20, 14L, 76 CR	19, 11L, 70 CR

CE = Chemistry Elective (CHM >300)

CE + L = Chemistry Elective + Lab

BCE = Biochemistry Elective (BCH > 300)

SE + L = Science Elective + Lab

SE = Science Elective; a 300 or 400 level course in CHM, BCH, BIO, PHY, or CSC111

BE = Biology Elective (BIO > 300)

BE2 = BIO 408, 414, 419, 430, 440, or 444

¹Five business courses: ECO101, MGT101, MKT201, ACC201, FIN201

²Major Electives: two courses in business, law or science; SE, MGT≥300, MKT≥300, ACC202, ECO102 or ECO≥200, IBUS301, PSC320 or 321

Chemistry ACS Certified: Suggested Schedule and Requirements

Freshman Year	
Fall	Spring
CHM 111 + L	CHM 112 + L
BIO 111 + L	
MAT 111	MAT 112
	PHY 223 + L

Sophomore Year	
Fall	Spring
CHM 227 + L	CHM 228 + L
CHM 244	CHM 230 + L
PHY 224 + L	

Junior Year	
Fall	Spring
CHM 301 + L	CHM 302 + L
CHM 420 + L*	CHM 430 + L
CHM 381	CHM 480

Senior Year	
Fall	Spring
CHM 334 + L	CE or BCE
BCH 301	CE or BCE
CHM 481	

“+ L” indicates that the corresponding laboratory is required.

*CHM 420 is offered every other year. If it is not offered in the junior year, take CHM 334 + L instead and move CHM 420 to the senior year

Chemistry: Suggested Schedule and Requirements

Freshman Year	
Fall	Spring
CHM 111 + L	CHM 112 + L
BIO 111 + L	MAT 112/141
MAT 111	

Sophomore Year	
Fall	Spring
CHM 227 + L	CHM 228 + L
PHY 201 + L	PHY 202 + L

Junior Year	
Fall	Spring
BCH 301	CHM 230 + L
CHM 244	CE or BCE
CHM 381	CHM 480

Senior Year	
Fall	Spring
CHM 301 + L	CHM 430 + L
CHM 334 + L	CE or BCE
CHM 481	CE or BCE

“+ L” indicates that the corresponding laboratory is required.

Chemistry Health Professions: Suggested Schedule and Requirements

Freshman Year	
Fall	Spring
CHM 111 + L	CHM 112 + L
BIO 111 + L	BIO 112 + L
MAT 111	MAT 112/141

Sophomore Year	
Fall	Spring
CHM 227 + L	CHM 228 + L
PHY 201 + L	PHY 202 + L

Junior Year	
Fall	Spring
CHM 244	CHM 230 + L
BCH 301	BCH 302
CHM 381	CHM 480

Senior Year	
Fall	Spring
CHM 301	CE or BCE + L or SE + L ¹
SE + L or CE or BCE + L ¹	SE
CHM 481	

“+ L” indicates that the corresponding laboratory is required.

¹ – Both SE + L and CE + L are required. If SE + L is taken in the fall, then CE + L is taken in the spring, and vice versa.

Chemistry with Business:
Suggested Schedule and Requirements

Freshman Year	
Fall	Spring
CHM 111 + L	CHM 112 + L
BIO 111 + L	BIO 112 + L
MAT 111	MAT 141 (or 112)

Sophomore Year	
Fall	Spring
CHM 227 + L	CHM 228 + L
PHY 201 + L	PHY 202 + L
ECO 101	MGT 101

Junior Year	
Fall	Spring
BCH 301 + L	Major Elective (Sci. or Bus.) ¹
CHM 381	(Analytical/Instrumental + L) ²
MKT 201	CHM 480
ACC 201	

Senior Year	
Fall	Spring
CHM 301	CE or BCE ³
FIN 201	Major Elective (Sci. or Bus.) ¹

¹**MAJOR ELECTIVES:** two courses in business, law or science; SE, MGT≥300, MKT≥300, ACC202, ECO102 or ECO≥200, IBUS301, PSC320 or 321.

²**ANALY/INSTR + L** choose one of the following analytical chemistry courses: CHM 334 + L, CHM 232 + L, CHM 230 + L, CHM 430 + L

³ or CHM 244

“+ L” indicates that the corresponding laboratory is required.

Chemistry ACS Certified with Business Minor:
Suggested Schedule and Requirements

Freshman Year	
Fall	Spring
CHM 111 + L	CHM 112 + L
BIO 111 + L	PHY 223 + L
MAT 111	MAT 112

Sophomore Year	
Fall	Spring
CHM 227 + L	CHM 228 + L
CHM 244	CHM 230 + L
PHY 224 + L	MAT 141 or ECO 255
ECO 101	ECO 102

Junior Year	
Fall	Spring
CHM 301 + L	CHM 302 + L
CHM 420 + L*	CHM 430 + L
CHM 381	CHM 480
MKT 201	MGT 101

Senior Year	
Fall	Spring
BCH 301	CE or BCE
CHM 334 + L	CE or BCE
CHM 481	FIN 201
ACC 201	

“+ L” indicates that the corresponding laboratory is required.

*CHM 420 is offered every other year. If it is not offered in the junior year, take CHM 334 + L instead and move CHM 420 to the senior year.

Chemistry with Business Minor:
Suggested Schedule and Requirements

Freshman Year	
Fall	Spring
CHM 111 + L	CHM 112 + L
BIO 111 + L	MAT 141 or ECO 255
MAT 111	

Sophomore Year	
Fall	Spring
CHM 227 + L	CHM 228 + L
PHY 201 + L	PHY 202 + L
	ECO 102

Junior Year	
Fall	Spring
BCH 301	CHM 230 + L
CHM 244	CE or BCE
ECO 101	CHM 480
CHM 381	MGT 101

Senior Year	
Fall	Spring
CHM 301 + L	CHM430 + L
CHM 334 + L	CE or BCE
CHM 481	CE or BCE
MKT 201	FIN 201
ACC 201	

“+ L” indicates that the corresponding laboratory is required.

Chemistry Health Professions with Business Minor:
Suggested Schedule and Requirements

Freshman Year	
Fall	Spring
CHM 111 + L	CHM 112 + L
BIO 111 + L	BIO 112 + L
MAT 111	MAT 141 or ECO 255

Sophomore Year	
Fall	Spring
CHM 227 + L	CHM 228 + L
PHY 201 + L	PHY 202 + L
ECO 101	ECO 102

Junior Year	
Fall	Spring
CHM 244	CHM 230 + L
BCH 301	BCH 302
CHM 381	CHM 480
MKT 201	MGT 101

Senior Year	
Fall	Spring
CHM 301	CE or BCE + L
SE + L	SE
CHM 481	FIN 201
ACC 201	

“+ L” indicates that the corresponding laboratory is required.

Biochemistry ACS Certified: Suggested Schedule and Requirements

Freshman Year	
Fall	Spring
CHM 111 + L	CHM 112 + L
BIO 111 + L	BIO 112 + L
MAT 111	MAT 112

Sophomore Year	
Fall	Spring
CHM 227 + L	CHM 228 + L
CHM 244	PHY 223 + L

Junior Year	
Fall	Spring
BCH 301 + L	CHM 230 + L
PHY 224 + L	BCH 302
CHM 420 ¹	CHM 480
CHM 381	

Senior Year	
Fall	Spring
CHM 301 + L	(CHM 430 + L) ²
(CHM 334 + L) ²	CHM 302 + L
CHM 481	BIO 450 + L

¹ CHM 420 is offered every other year. If it is not offered in the junior year, take CHM 334 + L instead and move CHM 420 to the senior year.

² Biochemistry Track requires CHM 334 + L or CHM 430 + L.

“+ L” indicates that the corresponding laboratory is required.

Biochemistry: Suggested Schedule and Requirements

Freshman Year	
Fall	Spring
CHM 111 + L	CHM 112 + L
BIO 111 + L	BIO 112 + L
MAT 111	MAT 112/141

Sophomore Year	
Fall	Spring
CHM 227 + L	CHM 228 + L
PHY 201 + L	PHY 202 + L

Junior Year	
Fall	Spring
BCH 301 + L	BCH 302
CHM 244	BCE or BE2
CHM 381	CHM 480

Senior Year	
Fall	Spring
CHM 301	(CHM 430 + L) ¹
(CHM 334 + L) ¹	BIO 450 + L
CHM 481	CE or BCE or BE

¹ Biochemistry Track requires CHM 334 + L or CHM 430 + L.

“+ L” indicates that the corresponding laboratory is required.

**Biochemistry ACS Certified with Business Minor:
Suggested Schedule and Requirements**

Freshman Year	
Fall	Spring
CHM 111 + L	CHM 112 + L
BIO 111 + L	BIO 112 + L
MAT 111	MAT 112

Sophomore Year	
Fall	Spring
CHM 227 + L	CHM 228 + L
CHM 244	PHY 223 + L
ECO 101	(MAT 141 or ECO 255) ¹
	ECO 102

Junior Year	
Fall	Spring
BCH 301 + L	BCH 302
CHM 420 ²	CHM 230 + L
PHY 224 + L	CHM 480
CHM 381	MGT 101

Senior Year	
Fall	Spring
CHM 301 + L	(CHM 430 + L) ³
(CHM 334 + L) ³	CHM 302 + L
CHM 481	BIO 450 + L
ACC 201	FIN 201
MKT 201	

¹ Students are required to take either ECO 255 or MAT 141 to satisfy minor requirements.

² CHM 420 is offered every other year. If it is not offered in the junior year, take CHM334 + L instead and move CHM 420 to the senior year.

³ Biochemistry Track requires CHM 334 + L or CHM 430 + L.

“+ L” indicates that the corresponding laboratory is required.

**Biochemistry with Business Minor:
Suggested Schedule and Requirements**

Freshman Year	
Fall	Spring
CHM 111 + L	CHM 112 + L
BIO 111 + L	BIO 112 + L
MAT 111	(MAT 141 or ECO 255) ¹

Sophomore Year	
Fall	Spring
CHM 227 + L	CHM 228 + L
PHY 201 + L	PHY 202 + L
ECO 101	ECO 102

Junior Year	
Fall	Spring
BCH 301 + L	BCH 302
CHM 244	BCE or BE2
CHM 381	CHM 480
	MGT 101

Senior Year	
Fall	Spring
CHM 301	BIO 450 + L
(CHM 334 + L) ²	(CHM 430 + L) ²
CHM 481	CE or BCE or BE
ACC 201	FIN 201
MKT 201	

¹ Students are required to take either ECO 255 or MAT 141 to satisfy minor requirements.

² Biochemistry Track requires CHM 334 + L or CHM 430 + L.

“+ L” indicates that the corresponding laboratory is required.

CHEMISTRY MINOR

Students majoring in various disciplines such as biology, mathematics, physics, bioinformatics, computer science, psychology and business can benefit from pursuing a minor in chemistry. The chemistry minor requires a student to complete the following sequence of courses:

- Two semesters of General Chemistry with laboratory:
CHM 111 + L and CHM 112 + L (8 credits)
- Two semesters of Organic Chemistry with laboratory:
CHM 227 + L and CHM 228 + L (8 credits)
- One semester of Analytical Chemistry with laboratory:
CHM 230 + L or CHM 334 + L or CHM 430 + L (4 credits)
- One semester of Physical Chemistry or Inorganic Chemistry:
CHM 301 or CHM 244 (3 credits)
- Chemistry Elective:
one CHM 300 or 400 level course (3 credits)

SUGGESTED MINORS

- School of Business
 - Business
 - Marketing
 - Management
- College of Arts & Sciences
 - Modern Language (Spanish, French, etc.)
 - Math
 - Physics
 - Computer Science
 - Information Technology
 - Biology
 - Psychology

RECOMMENDED ELECTIVES

For students interested in studying physical chemistry in graduate school:

- Calculus III (MAT 211), Linear Algebra (MAT 219) and Differential Equations (MAT 222)
- General Physics III (PHY 225), Basic Electronics (PHY 226) Classical Mechanics (PHY 443) and Quantum Mechanics (PHY 447)

For students interested in studying biological chemistry in graduate school:

- Molecular Biology (BIO 450) and Biotechnology (BIO 408)

For students interested in pharmacy school:

- Microbiology (BIO 307) and Human Anatomy & Physiology (BIO 114 & 115 and BIO 340)
- In addition to MAT 111 and MAT 141, top pharmacy schools require MAT 112. Consider taking both MAT 112 and MAT 141.
- Economics (macro or micro) (ECO 101 or 102) and Intro to Psychology (PSY 101 or 102) or Sociology (SOC 110).

For students interested in medical or dental school:

- Genetics (BIO 404), Medical Biochemistry (BIO 440) and Human Anatomy & Physiology (BIO 114 & 115)

OTHER IMPORTANT COURSES TO CONSIDER

BCH 450 Research in Biochemistry

3 Credits

Independent research under the direction of the biochemistry faculty. Students are required to spend 9 hours per week conducting research. [BCH 450](#) may be taken in place of a biochemistry elective without lab. Research and consultation times to be arranged after approval of department chair.

Prerequisite: permission of department chair.

Offered: fall & spring.

BCH 451 Research in Biochemistry

4 Credits

Independent research under the direction of the biochemistry faculty. Students are required to spend 12 hours per week conducting research. [BCH 451](#) may be taken in place of a biochemistry elective with lab. Research and consultation times to be arranged after approval of department chair.

Prerequisite: permission of department chair.

Offered: fall & spring.

CHM 450 Research in Chemistry

3 Credits

Independent research under the direction of the chemistry faculty. Students are required to spend 9 hours per week conducting research. [CHM 450](#) may be taken in place of a chemistry elective without lab. Research and consultation times to be arranged after approval of department chair.

Prerequisite: permission of department chair.

Offered: fall & spring.

CHM 451 Research in Chemistry

4 Credits

Independent research under the direction of the chemistry faculty. Students are required to spend 12 hours per week conducting research. [CHM 451](#) may be taken in place of a chemistry elective with lab. Research and consultation times to be arranged after approval of department chair.

Prerequisite: permission of department chair.

Offered: fall & spring.

CHM 490: Internships in Chemistry & Biochemistry

3 credits

Internships in chemical or biochemical industry under the direction of company and faculty supervisors. *Prerequisite:* Permission of the department chair. *Fall/Spring*

This course counts as a chemistry elective (CE), biochemistry elective (BCE), or a science elective (SE)

EXTRACURRICULAR ACTIVITIES IN THE SCIENCES

Student Chapter of the American Chemical Society (ACS).

Find us on GriffLink and the web:

<https://www.canisius.edu/academics/programs/chemistry-and-biochemistry/student-chapter-american-chemical-society-scacs>

Advisor: Dr. Sheridan

Physics Club

Colleges Against Cancer

Society of Pre-Health Professionals

INFORMATION FOR STUDENTS INTERESTED IN ATTENDING GRADUATE SCHOOL

FRESHMAN YEAR

- Keep your text books, quizzes, and exams (good resources for upper level courses, studying for the GRE, etc.).
- In early November, ask faculty about conducting summer research. In mid/late November complete the “application for research” form (available in Chemistry Dept. Office, also look for an e-mail announcement from the Chair of the Chem. Dept.).
- Get involved in 2-3 clubs or extracurricular activities. (But don’t over-commit!)

SOPHOMORE YEAR

- Keep your text books, quizzes, and exams.
- Complete summer research at Canisius College, another university, or a company such as Merck, Wyeth, or Glaxo. For a list of available internships, consult the department webpage (<https://www.canisius.edu/academics/programs/chemistry-and-biochemistry/undergraduate-research>).
- Consider applying for Research Experience for Undergraduates (REU) programs (http://www.nsf.gov/crssprgm/reu/reu_search.cfm), summer research at Roswell Park Cancer Institute, etc. These applications are often due early in the Spring semester so apply in January. Consider also an international Research Internship in Science and Engineering (RISE) (<http://www.daad.de/rise/en/>).
- Consider taking CHM 450 or BCH 450 in junior year.

JUNIOR YEAR

- Keep your text books, quizzes, and exams.
- Consider taking CHM 450 or BCH 450.
- Complete summer research at Canisius College, another university, or a company such as Merck, Wyeth, or Glaxo (see above “Sophomore year”).

- Consider applying for Research Experience for Undergraduates (REU) programs (http://www.nsf.gov/crssprgm/reu/reu_search.cfm), summer research at Roswell Park Cancer Institute, etc. (see above “Sophomore year”).
- In the summer, start researching graduate programs:
 Grad Schools.com: (<http://www.gradschools.com/Subject/Chemistry/64.html>),
 PhDs.org: (<http://www.phds.org/>),
 American Chemical Society: (<http://www.chemistry.org>).
- In the summer, start preparing for your general GRE (required) and subject test GRE in chemistry or biochemistry (some graduate schools recommend this) and look at dates/places where they will be offered. (<http://www.ets.org/gre/>).

SENIOR YEAR

- Keep your text books, quizzes, and exams.
- Consider taking CHM 450/451 or BCH 450/451.
- **In September, sign up to take the general GRE and the subject test GRE in chemistry or biochemistry in October or November** (<http://www.ets.org/gre/>)
- Apply to graduate programs (many are online) early, by **December or January**. Remember these are rolling admissions, so you need to apply near the start of the application period!!

INFORMATION FOR STUDENTS INTERESTED IN ATTENDING MEDICAL OR DENTAL SCHOOL

FRESHMAN YEAR

- Keep your text books, quizzes, and exams (good resources for upper level courses, studying for the MCAT or the DAT, etc.).
- Get involved in 2-3 clubs or extracurricular activities. (But don't over-commit!)
- **In the summer, you should be either conducting research or shadowing health professionals. Start arranging EARLY, around November, by talking to faculty in the Chemistry & Biochemistry Department or to the Director of Pre-Health Programs.**

SOPHOMORE YEAR

- Keep your text books, quizzes, and exams.
- During the school year, shadow health professionals or arrange to volunteer at Sisters of Charity, etc.
- In November, talk to faculty about conducting summer research at Canisius.
- **When registering for courses for Fall semester of your Junior Year, talk with your advisor about arranging your course load so that it is lighter in the Fall. You'll need to be studying for your MCAT or DAT.**

SUMMER BETWEEN SOPHOMORE AND JUNIOR YEAR

- Consider taking an MCAT/DAT prep. course (**plan on taking MCAT/DAT in January of your junior year**).
- **Start studying for your MCAT/DAT.**
- **Register to take your MCAT/DAT in January.**
- **Shadow a health care professional.**
- **Conduct summer research or work in a health-care related job.**
- **Ensure that you understand/research the Medical/Dental School application process. Begin to research Med/Dental School programs.**

JUNIOR YEAR

- **Plan on taking the MCAT or DAT in January** (so that, if necessary, you can retake it later in the spring). **Sign up during summer or start of Fall semester.**

To sign up for the MCAT, go to: (<http://www.aamc.org/students/applying/mcat>).

To sign up for the DAT, go to: (<http://www.ada.org/dat.aspx>).

- Spend the Fall semester and Christmas vacation studying for the MCAT/DAT so you are prepared to take it in January.
- If you have not taken a MCAT/DAT prep. course during the summer, take one during the Fall semester.
- During the Spring semester (after taking the MCAT/DAT), shadow health professionals or arrange to volunteer at Sisters of Charity, etc. (get some health-care related experience).
- **In late October / beginning of November, ask faculty if they can submit a letter of recommendation on your behalf to HSARC.** Provide them with a copy of your resume. A request for letters at the last minute reflects poorly on you!
- **In November, start preparing your HSARC application.** It reflects poorly on you to submit your application package late.
- In November, talk to faculty about conducting summer research at Canisius.
- In May, determine to which medical or dental schools you would like to apply.

Descriptions of MD (allopathic) programs can be found at: (<http://www.aamc.org/medicalschoools>).

Descriptions of DO (osteopathic) programs can be found at: (<http://www.aacom.org/>).

Descriptions of DDS programs can be found at: (<http://www.ada.org/267.aspx>).

- **By the beginning of May, start completing your medical or dental school applications.** Ask faculty if they will review your personal statement and activities list and descriptions. **Warning:** it takes longer than you think to prepare a good quality application (set aside 2 to 3 weeks).

- **By the end of May, complete your medical school or dental school applications.** You will want to submit your applications the first day you are able (usually June 2nd or 3rd).

To apply to medical schools granting MD's use the American Medical College Application Service (AMCAS): (<http://www.aamc.org/students/amcas/start.htm>).

To apply to medical schools granting DO's use the American Association of Colleges of Osteopathic Medicine (AACOM): (<http://www.aacom.org/InfoFor/applicants/Pages/default.aspx>).

However, some schools require you send an application package directly to them.

To apply to dental schools use the American Dental Education Association (ADEA): (<http://www.adea.org>). However, some schools require you send an application package directly to them.

- **Most medical schools and dental schools use rolling admissions. Therefore, applicants are reviewed and accepted continuously. If you apply late, fewer slots will be available than if you apply early.**
- **During the summer, after you have completed your application, you should be: conducting research or shadowing health professionals. Start arranging EARLY, around November, by talking to faculty in the Chemistry & Biochemistry Department or to the Director of Pre-Health Programs.**

SENIOR YEAR

- Keep your text books, quizzes, and exams.
- During the school year, shadow health professionals or arrange to volunteer at Sisters of Charity, etc.
- In early September, arrange for mock interviews with the Director of Pre-Health Programs.

INFORMATION FOR STUDENTS INTERESTED IN ATTENDING PHARMACY SCHOOL

A very useful web site for pre-pharmacy students with a lot of valuable information is (<https://www.aacp.org/resources/students/future>).

See page 19 of this handbook for the list of prerequisite courses required by pharmacy schools.

FRESHMAN YEAR

- Keep your text books, quizzes, and exams (good resource for upper level courses, studying for the PCAT, etc.).
- Get involved in 2-3 clubs or extracurricular activities. (But don't over-commit!)
- **In the summer, you should be either working as a pharmacy technician, shadowing pharmacists, or conducting research. Start arranging EARLY, around November, by talking to faculty in the Chemistry & Biochemistry Department or to the Director of Pre-Health Programs.**
- *Pharmacy Schools realize that there are limited numbers of pharm tech positions. They are looking for a commitment to patient care. Therefore any relevant health care experience builds your resume.

SOPHOMORE YEAR

- Keep your text books, quizzes, and exams.
- During the school year, shadow pharmacists or arrange to volunteer at Sisters of Charity, etc.
- In November, talk to faculty about conducting summer research at Canisius.
- **When registering for courses for Fall semester of your Junior Year, talk with your advisor about:**
 1. **arranging your course load so that it is lighter in the Spring. You'll need to be studying for your PCAT.**
 2. **what electives or upper level biology courses you should be taking in order to meet requirements for pharmacy school.**
 3. **3+4 program with UB Pharmacy School.**
- **Consider taking the PCAT during the summer.**

- **During the summer, you should be: conducting research or shadowing health professionals. Start arranging EARLY, around November, by talking to faculty in the Chemistry & Biochemistry Department or to the Director of Pre-Health Programs.**

JUNIOR YEAR

- Keep your text books, quizzes, and exams.
- During the school year, shadow pharmacists or arrange to volunteer at Sisters of Charity, etc.
- **In October or November, sign-up to take the PCAT.** Consider taking a review course (\$\$\$). To sign up or for information go to: (<http://tpc-etesting.com/pcat/>).
- In November, talk to faculty about conducting summer research at Canisius.
- **In March, ask faculty or pharmacists if they could submit a letter of recommendation on your behalf.** Provide them with a copy of your resume. It reflects poorly on you if you ask for letters at the last minute.
- In May, determine which pharmacy schools to which you will apply. Description of PharmD programs are available from Pharmacy College Application Service (PharmCAS) at: (<http://www.pharmcas.org>).
- **In the middle of May, start completing your pharmacy school applications.** Ask faculty if they will review your personal statement and activities list and descriptions.
- **By the middle of June, complete your pharmacy school applications.** You will want to submit your applications the first day you are able (usually around July 1st). Most pharmacy schools use PharmCAS: <http://www.pharmcas.org/>
- **Most pharmacy schools use rolling admissions. Therefore, applicants are reviewed and accepted continuously. If you apply late, fewer slots will be available than if you apply early.**
- **During the summer, you should be: conducting research or shadowing health professionals. Start arranging EARLY, around November, by talking to faculty in the Chemistry & Biochemistry Department or to the Director of Pre-Health Programs.**

SENIOR YEAR

- Keep your text books, quizzes, and exams.
- During the school year, shadow pharmacists or arrange to volunteer at Sisters of Charity, etc.
- In September, arrange for mock interviews with the Pre-Health Programs Director.

MEET THE FACULTY & STAFF

Phillip Sheridan

Department Chair / Professor (Physical Chemistry)
PhD, University of Arizona

sheridap@canisius.edu / HO 310A / (716) 888-2347

Teaching areas include general and physical chemistry. Research interests are in the electronic, bonding and geometric properties of small metal-containing radicals, which are studied in the gas-phase using high-resolution laser spectroscopy.

Allyson Backstrom

Director, George E. Schreiner, M.D. '43 Pre-Medical Center (Organic Chemistry)
PhD, Cornell University

backstra@canisius.edu / SH 1026A / (716) 888-2539

Primary teaching area: organic chemistry. As Director of the Pre-Med Center, Dr. Backstrom works with students to prepare them for entry into medical school and the full range of health professional schools.

Timothy Gregg

Associate Professor (Organic Chemistry)
PhD, University of Arizona

greggt@canisius.edu / HO 210A / (716) 888-2259

Teaching areas include organic chemistry and spectroscopy. Research interests are in organic synthesis, reaction mechanisms and the medicinal chemistry of neurotransmitter modulators.

Roberto Gregorius

Associate Professor (Chemical Education)
PhD, University of Massachusetts at Amherst (Polymer Science & Engineering)

gregorir@canisius.edu / HO 120B / (716) 888-3701

Teaching areas include general chemistry and science education. Research interests include Chemical Education: student-centered teaching and learning protocols suitable for both high school and first year college chemistry.

Mariusz Kozik

Professor (Inorganic Chemistry)
PhD, Georgetown University

kozik@canisius.edu / HO 120A / (716) 888-2337

Teaching areas include general chemistry, inorganic, organometallic and bioinorganic chemistry. Research interests are in the structures of polyoxometallates and their practical applications, most recently on carbon dioxide activation. Dr. Kozik is the 2008 recipient of the College of Arts and Sciences Faculty Service Award, and the 2010 recipient of the Kenneth Koessler Distinguished Faculty Award.

Mary O'Sullivan

Professor (Organic Chemistry)
PhD, University of Newcastle upon Tyne, U.K.

osulliv1@canisius.edu / HO 205 / (716) 888-2352

Teaching areas include organic chemistry, biological organic chemistry and spectroscopy. Research interests are in enzyme inhibition and the development of novel anti-parasitic agents, specifically new compounds designed to combat diseases caused by trypanosomes. Dr. O'Sullivan is the 2009 recipient of the College of Arts and Sciences Faculty Teaching Award.

Peter Schaber

Professor (Analytical Chemistry)
PhD, SUNY at Buffalo

schaber@canisius.edu / HO 302 / (716) 888-2351

Teaching areas include general and analytical chemistry. Research interests are in the synthesis, characterization and reactivity of transition metal complexes in "unusual" coordination spheres and the analysis of heavy metals in water and food.

Jeremy Steinbacher

Associate Professor (Organic and Materials Chemistry)
PhD, Cornell University

steinbaj@canisius.edu / HO 306 / (716) 888-2343

Teaching areas include organic chemistry, materials/biomaterials chemistry, and scientific literature and seminars. Research interests are particle-based drug-delivery and contrast agents focusing on cancer and magnetic resonance imaging, bionanoscience in general, and functional polymers.

Steven Szczepankiewicz

Associate Professor (Analytical Chemistry)
PhD, California Institute of Technology

szczepas@canisius.edu / HO 112 / (716) 888-2355

Teaching areas include general, analytical and environmental chemistry. Research interests are in the study of surface interactions with applications towards the development of new sensor technologies and photochemistry.

Kristina (Krit) Marohn

General Chemistry Laboratory Coordinator
MS, SUNY Fredonia

marohnk@canisius.edu / HO 111 / (716) 888-2348

Teaching areas include general chemistry laboratory classes. Professional experience includes a position as an Associate Engineer at AVOX Systems.

Joseph Bieron

Professor *Emeritus* of Organic Chemistry
PhD, SUNY at Buffalo

bieron@canisius.edu / HO 401 / (716) 888-2357

Canisius College Kenneth Koessler Distinguished Professor, 1983. WNY-ACS Schoellkopf Medal recipient, 1993. Research interests are in organic synthesis, NMR spectroscopy, and innovative teaching strategies.

Jaime Sheridan

Director of Chemistry Laboratories
PhD, University of Arizona

sherida6@canisius.edu / HO 209 / (716) 888-2344

Alice Steltermann

Administrative Associate

stelterm@canisius.edu / HO 206 / (716) 888-2340

COURSE DESCRIPTIONS

CHEMISTRY CURRICULUM

CHM 104 Energy, Environment, and Society **3 Credits**

Designed to provide a better understanding of energy and our environment, including man's interaction with his environment and the consequences facing society today.

This course satisfies the goals and objectives of Field 6, Natural Sciences.

Fulfills College Core: (part of the Sustainability Core Pathway), Field 6 (Natural Sciences), Global Awareness

Offered: every fall.

CHM 109 General Chemistry I with Review - Part I **3 Credits**

General Chemistry I for science majors, Part I, three lectures and one recitation per week. This course reviews some mathematical concepts, emphasizes dimensional analysis, nomenclature, stoichiometry, solutions, basic chemical reactions, and thermochemistry. This course satisfies the goals and objectives of Field 6, Natural Sciences.

Fulfills College Core: Field 6 (Natural Sciences)

Offered: every fall.

CHM 110 General Chemistry I with Review - Part II **3 Credits**

General Chemistry I for science majors, Part II, three lectures, one laboratory, and one recitation per week. This course emphasizes atomic and molecular structure, periodic properties, gas laws, and states of matter. The [CHM 109](#) and [CHM 110](#) sequence is equivalent to [CHM 111](#) and a free elective. Students completing the [CHM 109](#) and [CHM 110](#) sequence are eligible to take [CHM 112](#) in the fall of their sophomore year or during the summer. A minimum grade of C- in [CHM 110](#) is required for both [CHM 112](#) (General Chemistry II) and [CHM 227](#) (Organic Chemistry I).

Prerequisite: minimum grade of C- in [CHM 109](#). **Corequisite:** [CHM 111L](#).

Offered: every spring.

CHM 111 General Chemistry I **3 Credits**

General Chemistry I for science majors, three lectures, one laboratory, and one recitation per week. This course is recommended for students with a very good background in mathematics and significant exposure to high school chemistry. The course emphasizes dimensional analysis, nomenclature, stoichiometry, solutions, basic chemical reactions, thermochemistry, atomic and molecular structure, periodic properties, gas laws, and states of matter. A minimum grade of C- in [CHM 111](#) is a prerequisite for both [CHM 112](#) (General Chemistry II) and [CHM 227](#) (Organic Chemistry I). This course satisfies the goals and objectives of Field 6, Natural Sciences.

Prerequisite: minimum score of 580 in MSAT or permission of instructor. **Corequisite:** [CHM 111L](#).

Fulfills College Core: Field 6 (Natural Sciences)

Offered: every fall.

CHM 111L General Chemistry I Laboratory **1 Credit**

One three-hour lab per week.

Corequisite: [CHM 110](#) or [CHM 111](#).

Offered: every fall.

CHM 112 General Chemistry II **3 Credits**

General Chemistry II for science majors, three lectures, one laboratory, and one recitation per week. The course emphasizes properties of solutions, kinetics, chemical equilibrium concepts, calculations involving acid/base and precipitation equilibria, thermodynamics, electrochemistry, nuclear chemistry, and chemistry of the environment. A minimum grade of C in [CHM 112](#) is required for all chemistry and biochemistry majors. This course satisfies the goals and objectives of Field 6, Natural Sciences.

Prerequisite: minimum grade of C- in either [CHM 110](#) or [CHM 111](#). **Corequisite:** [CHM 112L](#).

Fulfills College Core: Field 6 (Natural Sciences)

Offered: every fall & spring.

CHM 112L General Chemistry II Laboratory **1 Credit**

One three-hour lab per week.

Prerequisite: minimum grade of C- in [CHM 111L](#). **Corequisite:** [CHM 112](#).

Offered: every fall & spring.

CHM 227 Organic Chemistry I **3 Credits**

Fundamental treatment of organic chemistry. Bonding, structure, nomenclature, and stereochemistry of organic functional groups. Mechanisms and reactivity in substitution and elimination reactions. Three lectures and one recitation per week.

Prerequisite: minimum grade of C- in either [CHM 110](#) or [CHM 111](#). **Corequisite:** [CHM 227L](#).

Offered: every fall.

CHM 227L Organic Chemistry I Laboratory **1 Credit**

One four-hour lab per week.

Prerequisite: minimum grade of C- in [CHM 111L](#). **Corequisite:** [CHM 227](#).

Offered: every fall.

CHM 228 Organic Chemistry II **3 Credits**

Continuation of organic chemistry. Includes chemistry and reaction mechanisms of unsaturated compounds, and oxygen and nitrogen-containing functional groups. Introduces the organic chemistry of carbohydrates, lipids and peptides. Laboratory expands on techniques for the synthesis, purification and investigation of the chemical properties of organic compounds. Three lectures, one laboratory, and one recitation per week.

Prerequisite: minimum grade of C- in [CHM 227](#). **Corequisite:** [CHM 228L](#).

Offered: every spring.

CHM 228L Organic Chemistry II Laboratory **1 Credit**

One four hour lab per week.

Prerequisite: minimum grade of C- in [CHM 227L](#). **Corequisite:** [CHM 228](#).

Offered: every spring.

CHM 230 Analytical Chemistry **3 Credits**

Principles and methodology of modern analytical chemistry presented with particular emphasis on statistical error analysis, solution equilibrium, and potentiometry. Three lectures, one laboratory, and one recitation per week.

Prerequisite: minimum grade of C in [CHM 112](#). **Corequisite:** [CHM 230L](#).

Offered: every spring.

CHM 230L Analytical Chemistry Laboratory **1 Credit**

One four-hour lab per week.

Prerequisite: minimum grade of C- in [CHM 112L](#). **Corequisite:** [CHM 230](#).

Offered: every spring.

CHM 232 Environmental Analytical Chemistry **3 Credits**

Environmental applications of analytical chemistry. Sampling techniques and statistical analysis of data. Soil chemistry, aquatic chemistry and atmospheric chemistry. Trace analysis with electroanalytical, liquid and gas chromatography, atomic absorption spectroscopy and ion selective electrodes. Three lectures, one laboratory and one recitation per week.

Prerequisite: [CHM 112](#). **Corequisite:** [CHM 232L](#).

Offered: spring 2021.

CHM 232L Environmental Analytical Chemistry Laboratory **1 Credit**

One four-hour lab per week.

Prerequisite: [CHM 112L](#). **Corequisite:** [CHM 232](#).

Offered: spring 2021.

CHM 244 Inorganic Chemistry **3 Credits**

Electronic configuration of atoms, periodic classification of the elements, nature of chemical bonding, symmetry and application of group theory to molecular orbitals, structures and thermodynamics of solids, bonding in metals and semiconductors, acid/base concepts, electrochemistry, isomerism, bonding, reactions and spectroscopy of coordination compounds, and other aspects of modern inorganic chemistry. Three lectures and one recitation per week.

Prerequisite: minimum grade of C in [CHM 112](#).

Offered: every fall.

CHM 301 Fundamental Physical Chemistry **3 Credits**

Fundamental topics in thermodynamics, kinetics, and quantum chemistry. Three lectures and one recitation per week.

Prerequisite: minimum grade of C in [CHM 112](#), successful completion of [MAT 111](#) or [MAT 110](#), and a year of physics ([PHY 201](#) & [PHY 202](#) or [PHY 223](#) & [PHY 224](#)).

Offered: every fall.

CHM 301L Fundamental Physical Chemistry Laboratory **1 Credit**

Selected experiments demonstrating principles of thermodynamics and chemical kinetics. One four-hour lab per week.

Prerequisite: minimum grade of C in [CHM 230L](#) & C in [CHM 301](#) (or concurrent registration in [CHM 301](#)).

Fulfills College Core: Advanced Writing-Intensive

Offered: fall of odd numbered years.

CHM 302 Modern Physical Chemistry **3 Credits**

Introduction to quantum chemistry with applications to the structure of atoms and molecules. Molecular spectroscopy. Three lectures and one recitation per week.

Prerequisite: minimum grade of C in [CHM 112](#), successful completion of [MAT 111](#) or [MAT 110](#); [MAT 112](#); and a year of physics ([PHY 201](#) & [PHY 202](#) or [PHY 223](#) & [PHY 224](#)).

Offered: spring of even numbered years.

CHM 302L Modern Physical Chemistry Laboratory **1 Credit**

Selected spectroscopy experiments with applications to molecular structure. One four-hour lab per week.

Prerequisite: [CHM 302](#) (or concurrent registration in [CHM 302](#)) & minimum grade of C in [CHM 230L](#), [CHM 301L](#), [CHM 334L](#) or [CHM 430L](#).

Offered: spring of even numbered years.

CHM 334 Spectrometric Analysis **3 Credits**

Spectrometric methods for the elucidation of chemical structures. Includes nuclear magnetic resonance, infrared, ultraviolet and mass spectrometry. Emphasis on organic compounds. Three lectures and one laboratory per week.

Prerequisite: [CHM 228](#).

Offered: every fall.

CHM 334L Spectrometric Analysis Lab **1 Credit**

One four-hour lab per week.

Prerequisite: [CHM 228L](#)

Offered: every fall.

CHM 338 Intermediate Organic Chemistry **3 Credits**

Important basic concepts in organic chemistry are reviewed at a higher level than is possible in the introductory courses. New concepts are presented in the areas of reaction mechanisms, frontier molecular orbitals, physical organic chemistry, and in stereoelectronic effects.

Prerequisite: [CHM 228](#).

Offered: occasionally in spring.

CHM 344 Metal Ions in Biological Systems **3 Credits**

Chemical processes in biological systems, which include participation of metal ions, are covered. The course begins with the principles of coordination chemistry and structural biochemistry. The rest of the course is organized according to the functions performed by the metal centers: gene expression and signal transduction, digestion, bioenergetics and electron transfer, oxygen transport, liver functions and anticancer drugs.

Prerequisite: [CHM 228](#).

Offered: occasionally in spring.

CHM 381 Scientific Literature and Communication **1 Credit**

First of three student-faculty seminars for majors. Introduces scientific literature, technical writing and oral communication in chemistry and allied fields.

Prerequisite: [CHM 228](#) & junior standing.

Offered: every fall.

CHM 401 Modern Synthetic Methods **3 Credits**

Structure-reactivity relationships in organometallic chemistry and the application of organometallic compounds in organic synthesis, including industrial catalysis.

Prerequisite: [CHM 228](#) & [CHM 244](#).

Offered: occasionally in spring.

CHM 401L Modern Synthetic Methods Laboratory **1 Credit**

Designed to illustrate some of the most important synthetic and physical techniques used by modern synthetic chemists.

Prerequisite: [CHM 401](#) (or concurrent registration).

Offered: occasionally in spring.

CHM 402 Advanced Physical Chemistry **3 Credits**

Introduction to statistical thermodynamics. Applications of group theory to chemical bonding and molecular spectroscopy. Angular momentum coupling in atomic and molecular spectroscopy. Three lectures per week.

Prerequisites: [MAT 111](#) & [MAT 112](#); [CHM 244](#); [CHM 302](#) (may be taken concurrently); and either [PHY 201](#) & [PHY 202](#) or [PHY 223](#) & [PHY 224](#).

Offered: occasionally in spring.

CHM 420 Materials Chemistry**3 Credits**

A survey of topics and applications in modern materials chemistry including solid state materials, semiconductors, polymers, nanomaterials, and introductions to mechanical properties, device fabrication, and structure-activity relationships.

Prerequisite: [CHM 228](#) & [CHM 244](#) (or concurrent registration in [CHM 244](#)).

Corequisite: [CHM 420L](#).

Offered: spring of odd numbered years.

CHM 420L Materials Chemistry Laboratory**1 Credit**

This laboratory develops concepts introduced in the lecture component of Materials Chemistry, CHM420, including solid-state structure, mechanical properties, semiconductors, polymers, and nanomaterials. The lab meets for four hours per week.

Prerequisite: [CHM 228L](#) (may be taken concurrently). **Corequisite:** [CHM 420](#).

Offered: spring of odd numbered years.

CHM 430 Instrumental Analytical Chemistry**3 Credits**

Advanced instrumental methods of analysis including spectroscopy, chromatography and various electrochemical techniques. Three lectures and one laboratory per week.

Prerequisite: [CHM 112](#) & [CHM 228](#) (or concurrent registration in [CHM 228](#)).

Offered: spring of odd numbered years.

CHM 430L Instrumental Analytical Chemistry Laboratory**1 Credit**

One four-hour lab per week.

Prerequisite: [CHM 112L](#) & [CHM 228L](#) (or concurrent registration in [CHM 228L](#)).

Corequisite: [CHM 430](#).

Offered: spring of odd numbered years.

CHM 450 Research in Chemistry**3 Credits**

Independent research under the direction of the chemistry faculty. Students are required to spend 9 hours per week conducting research. [CHM 450](#) may be taken in place of a chemistry elective without lab. Research and consultation times to be arranged after approval of department chair.

Prerequisite: permission of department chair.

Offered: fall & spring.

CHM 451 Research in Chemistry**4 Credits**

Independent research under the direction of the chemistry faculty. Students are required to spend 12 hours per week conducting research. [CHM 451](#) may be taken in place of a chemistry elective with lab. Research and consultation times to be arranged after approval of department chair.

Prerequisite: permission of department chair.

Offered: fall & spring.

CHM 455 Medicinal Chemistry **3 Credits**

Chemical principles are used to explain the interaction of drugs with biological targets. Strategies used in the design and development of medicines are discussed.

Prerequisite: minimum grade of C- in both [CHM 228](#) & [BCH 301](#).

Offered: spring 2021.

CHM 480 Communicating Concepts in Chemistry **1 Credit**

Second of three student-faculty seminars for majors. Students give a 25-minute presentation on an advanced coursework topic. Emphasis is placed on the process and the mechanics of constructing a scientific talk.

Prerequisite: [CHM 228](#) & junior standing.

Offered: every spring.

CHM 481 Communicating Research Literature **1 Credit**

Third of three student-faculty seminars for majors. Students give a 45-minute presentation on a scientific work from the chemical literature. Emphasis is placed on constructing a narrative and gaining a working understanding of the scientific issues in the presented paper.

Prerequisite: [CHM 228](#), [CHM 381](#), & junior standing.

Fulfills College Core: Oral Communication

Offered: every fall.

CHM 490 Chemistry Internship **3 Credits**

Internships in chemical or biochemical industry under the direction of company and faculty supervisors.

Prerequisite: permission of department chair & associate dean.

Offered: fall & spring.

CHM 499 Independent Study **3-4 Credits**

Independent study under the direction of the chemistry faculty. Independent studies require an application and approval by the associate dean.

Prerequisite: permission of the instructor, department chair, & associate dean.

Offered: fall & spring.

BIOCHEMISTRY CURRICULUM

BCH 301 Introduction to Biochemistry **3 Credits**

Structure and function of biological molecules. Topics include proteins, carbohydrates, nucleic acids, lipids, enzyme kinetics, ligand binding, recombinant DNA technology and cell membrane structure and transport. Three lectures and one recitation per week.

Prerequisite: minimum grade of C- in [CHM 228](#).

Offered: every fall.

BCH 301L Introduction to Biochemistry Laboratory **1 Credit**

One four-hour lab per week.

Prerequisite: [BCH 301](#) (or concurrent registration).

Offered: every fall.

BCH 302 Cellular Biochemistry **3 Credits**

The more biological aspects of biochemistry. Topics include signal transduction, bioenergetics, metabolism of carbohydrates, lipids, proteins and metabolic control, emphasizing hormones. Three lectures and one recitation per week.

Prerequisite: minimum grade of C- in [BCH 301](#).

Offered: every spring.

BCH 403 Molecular Biology **3 Credits**

Biochemical processes at the cellular and molecular level. Topics include DNA structure in chromosomes, replication, repair, and recombination, DNA transcription, RNA structure and function, protein translation and regulation of these processes.

Prerequisite: minimum grade of C- in [BCH 301](#).

Offered: spring of odd numbered years.

BCH 403L Molecular Biology Laboratory **1 Credit**

One four-hour lab per week.

Prerequisite: [BCH 301L](#) & [BCH 403](#) (or concurrent registration in [BCH 403](#)).

Fulfills College Core: Advanced Writing-Intensive

Offered: spring of odd numbered years.

BCH 450 Research in Biochemistry **3 Credits**

Independent research under the direction of the biochemistry faculty. Students are required to spend 9 hours per week conducting research. [BCH 450](#) may be taken in place of a biochemistry elective without lab. Research and consultation times to be arranged after approval of department chair.

Prerequisite: permission of department chair

Offered: fall & spring.

BCH 451 Research in Biochemistry **4 Credits**

Independent research under the direction of the biochemistry faculty. Students are required to spend 12 hours per week conducting research. [BCH 451](#) may be taken in place of a biochemistry elective with lab. Research and consultation times to be arranged after approval of department chair.

Prerequisite: permission of department chair.

Offered: fall & spring.

BCH 499 Independent Study **3 Credits**

Independent study under the direction of the biochemistry professor. Independent studies require an application and approval by the associate dean.

Prerequisite: permission of the instructor, department chair, & associate dean.

Offered: fall & spring.

Chemistry ACS Track: Course Completion Checklist
MAJOR REQUIREMENTS

- | | |
|--|--|
| <input type="checkbox"/> CHM 111 + L _____ | <input type="checkbox"/> CHM 112 + L _____ |
| <input type="checkbox"/> BIO 111 + L _____ | |
| <input type="checkbox"/> MAT 111 _____ | <input type="checkbox"/> MAT 112 _____ |
| <input type="checkbox"/> PHY 223 + L _____ | <input type="checkbox"/> PHY 224 + L _____ |
| <input type="checkbox"/> CHM 227 + L _____ | <input type="checkbox"/> CHM 228 + L _____ |
| <input type="checkbox"/> CHM 244 _____ | <input type="checkbox"/> CHM 230 + L _____ |
| <input type="checkbox"/> CHM 301 + L _____ | <input type="checkbox"/> CHM 302 + L _____ |
| <input type="checkbox"/> CHM 334 + L _____ | <input type="checkbox"/> CHM 430 + L _____ |
| <input type="checkbox"/> BCH 301 _____ | <input type="checkbox"/> CHM 420 + L _____ |
| <input type="checkbox"/> CE or BCE _____ | <input type="checkbox"/> CE or BCE _____ |
| <input type="checkbox"/> CHM 381 _____ | <input type="checkbox"/> CHM 480 _____ |
| <input type="checkbox"/> CHM 481 _____ | |

CORE REQUIREMENTS

- | | |
|---|----------------------------------|
| <input type="checkbox"/> ENG 111 | <input type="checkbox"/> ENG 112 |
| <input type="checkbox"/> PHI 101 | <input type="checkbox"/> RST 101 |
| <input type="checkbox"/> Field 1 Religious Studies and Theology | Course Name: _____ |
| <input type="checkbox"/> Field 2 Philosophy | Course Name: _____ |
| <input type="checkbox"/> Field 3 Arts | Course Name: _____ |
| <input type="checkbox"/> Field 4 History | Course Name: _____ |
| <input type="checkbox"/> Field 5 Social Sciences | Course Name: _____ |
| <input type="checkbox"/> CORE CAPSTONE | Course Name: _____ |
| <input type="checkbox"/> Diversity | Course Name: _____ |
| <input type="checkbox"/> Ethics | Course Name: _____ |
| <input type="checkbox"/> Global Awareness | Course Name: _____ |
| <input type="checkbox"/> Justice | Course Name: _____ |
| <input type="checkbox"/> Advanced Writing-intensive | Course Name: _____ |
| <input type="checkbox"/> Oral Communication | Course Name: _____ |

Chemistry Track: Course Completion Checklist
MAJOR REQUIREMENTS

- | | |
|--|--|
| <input type="checkbox"/> CHM 111 + L _____ | <input type="checkbox"/> CHM 112 + L _____ |
| <input type="checkbox"/> BIO 111 + L _____ | |
| <input type="checkbox"/> MAT 111 _____ | <input type="checkbox"/> MAT 112/141 _____ |
| <input type="checkbox"/> PHY 201 + L _____ | <input type="checkbox"/> PHY 202 + L _____ |
| <input type="checkbox"/> CHM 227 + L _____ | <input type="checkbox"/> CHM 228 + L _____ |
| <input type="checkbox"/> CHM 244 _____ | <input type="checkbox"/> CHM 230 + L _____ |
| <input type="checkbox"/> CHM 301 + L _____ | <input type="checkbox"/> CHM 334 + L _____ |
| <input type="checkbox"/> CHM 430 + L _____ | <input type="checkbox"/> BCH 301 _____ |
| <input type="checkbox"/> CE or BCE _____ | <input type="checkbox"/> CE or BCE _____ |
| <input type="checkbox"/> CE or BCE _____ | <input type="checkbox"/> CHM 381 _____ |
| <input type="checkbox"/> CHM 480 _____ | <input type="checkbox"/> CHM 481 _____ |

CORE REQUIREMENTS

- | | |
|---|----------------------------------|
| <input type="checkbox"/> ENG 111 | <input type="checkbox"/> ENG 112 |
| <input type="checkbox"/> PHI 101 | <input type="checkbox"/> RST 101 |
| <input type="checkbox"/> Field 1 Religious Studies and Theology | Course Name: _____ |
| <input type="checkbox"/> Field 2 Philosophy | Course Name: _____ |
| <input type="checkbox"/> Field 3 Arts | Course Name: _____ |
| <input type="checkbox"/> Field 4 History | Course Name: _____ |
| <input type="checkbox"/> Field 5 Social Sciences | Course Name: _____ |
| <input type="checkbox"/> CORE CAPSTONE | Course Name: _____ |
| <input type="checkbox"/> Diversity | Course Name: _____ |
| <input type="checkbox"/> Ethics | Course Name: _____ |
| <input type="checkbox"/> Global Awareness | Course Name: _____ |
| <input type="checkbox"/> Justice | Course Name: _____ |
| <input type="checkbox"/> Advanced Writing-intensive | Course Name: _____ |
| <input type="checkbox"/> Oral Communication | Course Name: _____ |

Chemistry Health Professions Track: Course Completion Checklist

MAJOR REQUIREMENTS

- | | |
|--|--|
| <input type="checkbox"/> CHM 111 + L _____ | <input type="checkbox"/> CHM 112 + L _____ |
| <input type="checkbox"/> BIO 111 + L _____ | <input type="checkbox"/> BIO 112 + L _____ |
| <input type="checkbox"/> MAT 111 _____ | <input type="checkbox"/> MAT 112 / 141 _____ |
| <input type="checkbox"/> PHY 201 + L _____ | <input type="checkbox"/> PHY 202 + L _____ |
| <input type="checkbox"/> CHM 227 + L _____ | <input type="checkbox"/> CHM 228 + L _____ |
| <input type="checkbox"/> CHM 244 _____ | <input type="checkbox"/> CHM 230 + L _____ |
| <input type="checkbox"/> CHM 301 _____ | |
| <input type="checkbox"/> BCH 301 _____ | <input type="checkbox"/> BCH 302 _____ |
| <input type="checkbox"/> CE or BCE + L _____ | <input type="checkbox"/> SE + L _____ |
| <input type="checkbox"/> SE _____ | <input type="checkbox"/> CHM 381 _____ |
| <input type="checkbox"/> CHM 480 _____ | <input type="checkbox"/> CHM 481 _____ |

CORE REQUIREMENTS

- | | |
|---|----------------------------------|
| <input type="checkbox"/> ENG 111 | <input type="checkbox"/> ENG 112 |
| <input type="checkbox"/> PHI 101 | <input type="checkbox"/> RST 101 |
| <input type="checkbox"/> Field 1 Religious Studies and Theology | Course Name: _____ |
| <input type="checkbox"/> Field 2 Philosophy | Course Name: _____ |
| <input type="checkbox"/> Field 3 Arts | Course Name: _____ |
| <input type="checkbox"/> Field 4 History | Course Name: _____ |
| <input type="checkbox"/> Field 5 Social Sciences | Course Name: _____ |
| <input type="checkbox"/> CORE CAPSTONE | Course Name: _____ |
| <input type="checkbox"/> Diversity | Course Name: _____ |
| <input type="checkbox"/> Ethics | Course Name: _____ |
| <input type="checkbox"/> Global Awareness | Course Name: _____ |
| <input type="checkbox"/> Justice | Course Name: _____ |
| <input type="checkbox"/> Advanced Writing-intensive | Course Name: _____ |
| <input type="checkbox"/> Oral Communication | Course Name: _____ |

Chemistry with Business Track: Course Completion Checklist

MAJOR REQUIREMENTS IN SCIENCE

- | | | | |
|---|-------|---|-------|
| <input type="checkbox"/> CHM 111 + L | _____ | <input type="checkbox"/> CHM 112 + L | _____ |
| <input type="checkbox"/> BIO 111 + L | _____ | <input type="checkbox"/> BIO 112 + L | _____ |
| <input type="checkbox"/> MAT 111 | _____ | <input type="checkbox"/> MAT 141 (or 112) | _____ |
| <input type="checkbox"/> PHY 201 + L (or 223) | _____ | <input type="checkbox"/> PHY 202 + L (or 224) | _____ |
| <input type="checkbox"/> CHM 227 + L | _____ | <input type="checkbox"/> CHM 228 + L | _____ |
| <input type="checkbox"/> CHM 301 | _____ | <input type="checkbox"/> ANALY + L ¹ | _____ |
| <input type="checkbox"/> BCH 301 + L | _____ | <input type="checkbox"/> CE or BCE ² | _____ |
| <input type="checkbox"/> CHM 381 | _____ | <input type="checkbox"/> CHM 480 | _____ |

MAJOR REQUIREMENTS IN BUSINESS

- | | | | |
|----------------------------------|-------|----------------------------------|-------|
| <input type="checkbox"/> ECO 101 | _____ | <input type="checkbox"/> MGT 101 | _____ |
| <input type="checkbox"/> MKT 201 | _____ | <input type="checkbox"/> ACC 201 | _____ |
| <input type="checkbox"/> FIN 201 | _____ | | |

MAJOR ELECTIVES³ IN SCIENCE, BUSINESS, OR LAW

- | | | | |
|--------------------------------------|-------|--------------------------------------|-------|
| <input type="checkbox"/> MAJOR ELEC. | _____ | <input type="checkbox"/> MAJOR ELEC. | _____ |
|--------------------------------------|-------|--------------------------------------|-------|

¹**ANALY + L** (total 4 credit hours) - choose one of the following analytical chemistry courses:

- CHM 334 + L (Spectrometric Analysis);
- CHM 232 + L (Analytical Environmental Chemistry);
- CHM 230 + L (Analytical Chemistry);
- CHM 430 + L (Instrumental Analytical Chemistry).

² or CHM 244.

Continued on the next page

³Two Major Electives - choose two courses from any of the following science, business, or law courses:

- Science Elective (300-level or higher CHM/BCH/BIO/PHY course, or CSC 111)
- MGT course at 300-level or higher with a MGT pre-req.; including, MGT460, MGT 475, MGT 380, MGT 472 (or other MGT 300/400-level courses approved by the Assistant Dean, School of Business).
- MKT course at 300-level or higher with a MKT pre-req.; including, MKT 371, MKT 350, MKT 395, MKT 397, MKT 450 (or other MKT 300/400-level courses approved by the Assistant Dean, School of Business).
- ACC 202 (Managerial Accounting);
- ECO 102 or ECO course at 200-level or higher with an ECO pre-req (as approved by the Assistant Dean, School of Business).
- IBUS301 (International Business);
- PSC 320, 321 (American Constitutional Law, recommended for pre-law students).

CORE REQUIREMENTS

<input type="checkbox"/> ENG 111 <input type="checkbox"/> PHI 101 <input type="checkbox"/> Field 1 Religious Studies and Theology <input type="checkbox"/> Field 2 Philosophy <input type="checkbox"/> Field 3 Arts <input type="checkbox"/> Field 4 History <input checked="" type="checkbox"/> Field 5 Social Sciences <input type="checkbox"/> CORE CAPSTONE <input type="checkbox"/> Diversity <input type="checkbox"/> Ethics <input type="checkbox"/> Global Awareness <input type="checkbox"/> Justice <input type="checkbox"/> Advanced Writing-intensive <input type="checkbox"/> Oral Communication	<input type="checkbox"/> ENG 112 <input type="checkbox"/> RST 101 Course Name: _____ Course Name: _____ Course Name: _____ Course Name: _____ Course Name: <u>ECO 101</u> Course Name: _____ Course Name: _____ Course Name: _____ Course Name: _____ Course Name: _____ Course Name: _____
--	---

Chemistry ACS Certified Track with Business Minor: Course Completion Checklist

MAJOR REQUIREMENTS

- | | |
|--|---|
| <input type="checkbox"/> CHM 111 + L _____ | <input type="checkbox"/> CHM 112 + L _____ |
| <input type="checkbox"/> BIO 111 + L _____ | <input type="checkbox"/> MAT 141 or ECO 255 _____ |
| <input type="checkbox"/> MAT 111 _____ | <input type="checkbox"/> MAT 112 _____ |
| <input type="checkbox"/> PHY 223 + L _____ | <input type="checkbox"/> PHY 224 + L _____ |
| <input type="checkbox"/> CHM 227 + L _____ | <input type="checkbox"/> CHM 228 + L _____ |
| <input type="checkbox"/> CHM 244 _____ | <input type="checkbox"/> CHM 230 + L _____ |
| <input type="checkbox"/> CHM 301 + L _____ | <input type="checkbox"/> CHM 302 + L _____ |
| <input type="checkbox"/> CHM 334 + L _____ | <input type="checkbox"/> CHM 430 + L _____ |
| <input type="checkbox"/> BCH 301 _____ | <input type="checkbox"/> CHM 420 + L _____ |
| <input type="checkbox"/> CE or BCE _____ | <input type="checkbox"/> CE or BCE _____ |
| <input type="checkbox"/> CHM 381 _____ | <input type="checkbox"/> CHM 480 _____ |
| <input type="checkbox"/> CHM 481 _____ | |

MINOR REQUIREMENTS

- | | |
|--|--|
| <input type="checkbox"/> ECO 101 _____ | <input type="checkbox"/> ECO 102 _____ |
| <input type="checkbox"/> MGT 101 _____ | <input type="checkbox"/> MKT 201 _____ |
| <input type="checkbox"/> ACC 201 _____ | <input type="checkbox"/> FIN 201 _____ |

CORE REQUIREMENTS

- | | |
|---|----------------------------------|
| <input type="checkbox"/> ENG 111 | <input type="checkbox"/> ENG 112 |
| <input type="checkbox"/> PHI 101 | <input type="checkbox"/> RST 101 |
| <input type="checkbox"/> Field 1 Religious Studies and Theology | Course Name: _____ |
| <input type="checkbox"/> Field 2 Philosophy | Course Name: _____ |
| <input type="checkbox"/> Field 3 Arts | Course Name: _____ |
| <input type="checkbox"/> Field 4 History | Course Name: _____ |
| <input checked="" type="checkbox"/> Field 5 Social Sciences | Course Name: <u>ECO 101</u> |

- CORE CAPSTONE
- Diversity
- Ethics
- Global Awareness
- Justice
- Advanced Writing-intensive
- Oral Communication

Course Name: _____

Course Name: _____

Course Name: _____

Course Name: _____

Course Name: _____

Course Name: _____

Course Name: _____

Chemistry Track with Business Minor: Course Completion Checklist

MAJOR REQUIREMENTS

- | | |
|--|---|
| <input type="checkbox"/> CHM 111 + L _____ | <input type="checkbox"/> CHM 112 + L _____ |
| <input type="checkbox"/> BIO 111 + L _____ | |
| <input type="checkbox"/> MAT 111 _____ | <input type="checkbox"/> MAT 141 or ECO 255 _____ |
| <input type="checkbox"/> PHY 201 + L _____ | <input type="checkbox"/> PHY 202 + L _____ |
| <input type="checkbox"/> CHM 227 + L _____ | <input type="checkbox"/> CHM 228 + L _____ |
| <input type="checkbox"/> CHM 244 _____ | <input type="checkbox"/> CHM 230 + L _____ |
| <input type="checkbox"/> CHM 301 + L _____ | <input type="checkbox"/> CHM 334 + L _____ |
| <input type="checkbox"/> CHM 430 + L _____ | <input type="checkbox"/> BCH 301 _____ |
| <input type="checkbox"/> CE or BCE _____ | <input type="checkbox"/> CE or BCE _____ |
| <input type="checkbox"/> CE or BCE _____ | <input type="checkbox"/> CHM 381 _____ |
| <input type="checkbox"/> CHM 480 _____ | <input type="checkbox"/> CHM 481 _____ |

MINOR REQUIREMENTS

- | | |
|--|--|
| <input type="checkbox"/> ECO 101 _____ | <input type="checkbox"/> ECO 102 _____ |
| <input type="checkbox"/> MGT 101 _____ | <input type="checkbox"/> MKT 201 _____ |
| <input type="checkbox"/> ACC 201 _____ | <input type="checkbox"/> FIN 201 _____ |

CORE REQUIREMENTS

- | | |
|---|----------------------------------|
| <input type="checkbox"/> ENG 111 | <input type="checkbox"/> ENG 112 |
| <input type="checkbox"/> PHI 101 | <input type="checkbox"/> RST 101 |
| <input type="checkbox"/> Field 1 Religious Studies and Theology | Course Name: _____ |
| <input type="checkbox"/> Field 2 Philosophy | Course Name: _____ |
| <input type="checkbox"/> Field 3 Arts | Course Name: _____ |
| <input type="checkbox"/> Field 4 History | Course Name: _____ |
| <input checked="" type="checkbox"/> Field 5 Social Sciences | Course Name: <u>ECO 101</u> |
| <input type="checkbox"/> CORE CAPSTONE | Course Name: _____ |

- Diversity
- Ethics
- Global Awareness
- Justice
- Advanced Writing-intensive
- Oral Communication

Course Name: _____

Course Name: _____

Course Name: _____

Course Name: _____

Course Name: _____

Course Name: _____

Chemistry Health Professions Track with Business Minor: Course Completion Checklist

MAJOR REQUIREMENTS

- | | |
|---|---|
| <input type="checkbox"/> CHM 111 + L _____ | <input type="checkbox"/> CHM 112 + L _____ |
| <input type="checkbox"/> BIO 111 + L _____ | <input type="checkbox"/> BIO 112 + L _____ |
| <input type="checkbox"/> MAT 111 _____ | <input type="checkbox"/> MAT 141 or ECO 255 _____ |
| <input type="checkbox"/> PHY 201 + L _____ | <input type="checkbox"/> PHY 202 + L _____ |
| <input type="checkbox"/> CHM 227 + L _____ | <input type="checkbox"/> CHM 228 + L _____ |
| <input type="checkbox"/> CHM 244 _____ | <input type="checkbox"/> CHM 230 + L _____ |
| <input type="checkbox"/> CHM 301 _____ | |
| <input type="checkbox"/> BCH 301 _____ | <input type="checkbox"/> BCH 302 _____ |
| <input type="checkbox"/> CE or BCE+ L _____ | <input type="checkbox"/> SE + L _____ |
| <input type="checkbox"/> SE _____ | <input type="checkbox"/> CHM 381 _____ |
| <input type="checkbox"/> CHM 480 _____ | <input type="checkbox"/> CHM 481 _____ |

MINOR REQUIREMENTS

- | | |
|--|--|
| <input type="checkbox"/> ECO 101 _____ | <input type="checkbox"/> ECO 102 _____ |
| <input type="checkbox"/> MGT 101 _____ | <input type="checkbox"/> MKT 201 _____ |
| <input type="checkbox"/> ACC 201 _____ | <input type="checkbox"/> FIN 201 _____ |

CORE REQUIREMENTS

- | | |
|---|----------------------------------|
| <input type="checkbox"/> ENG 111 | <input type="checkbox"/> ENG 112 |
| <input type="checkbox"/> PHI 101 | <input type="checkbox"/> RST 101 |
| <input type="checkbox"/> Field 1 Religious Studies and Theology | Course Name: _____ |
| <input type="checkbox"/> Field 2 Philosophy | Course Name: _____ |
| <input type="checkbox"/> Field 3 Arts | Course Name: _____ |
| <input type="checkbox"/> Field 4 History | Course Name: _____ |
| <input checked="" type="checkbox"/> Field 5 Social Sciences | Course Name: <u>ECO 101</u> |
| <input type="checkbox"/> CORE CAPSTONE | Course Name: _____ |

- Diversity
- Ethics
- Global Awareness
- Justice
- Advanced Writing-intensive
- Oral Communication

Course Name: _____

Course Name: _____

Course Name: _____

Course Name: _____

Course Name: _____

Course Name: _____

Biochemistry ACS Certified Track: Course Completion Checklist
MAJOR REQUIREMENTS

- | | |
|---|--|
| <input type="checkbox"/> CHM 111 + L _____ | <input type="checkbox"/> CHM 112 + L _____ |
| <input type="checkbox"/> BIO 111 + L _____ | <input type="checkbox"/> BIO 112 + L _____ |
| <input type="checkbox"/> MAT 111 _____ | <input type="checkbox"/> MAT 112 _____ |
| <input type="checkbox"/> PHY 223 + L _____ | <input type="checkbox"/> PHY 224 + L _____ |
| <input type="checkbox"/> CHM 227 + L _____ | <input type="checkbox"/> CHM 228 + L _____ |
| <input type="checkbox"/> CHM 244 _____ | <input type="checkbox"/> CHM 230 + L _____ |
| <input type="checkbox"/> CHM 301 + L _____ | <input type="checkbox"/> CHM 302 + L _____ |
| <input type="checkbox"/> BCH 301 + L _____ | <input type="checkbox"/> BCH 302 _____ |
| <input type="checkbox"/> CHM 334 + L or 430 + L _____ | <input type="checkbox"/> CHM 420 _____ |
| <input type="checkbox"/> BIO 450 + L _____ | <input type="checkbox"/> CHM 381 _____ |
| <input type="checkbox"/> CHM 480 _____ | <input type="checkbox"/> CHM 481 _____ |

CORE REQUIREMENTS

- | | |
|---|----------------------------------|
| <input type="checkbox"/> ENG 111 | <input type="checkbox"/> ENG 112 |
| <input type="checkbox"/> PHI 101 | <input type="checkbox"/> RST 101 |
| <input type="checkbox"/> Field 1 Religious Studies and Theology | Course Name: _____ |
| <input type="checkbox"/> Field 2 Philosophy | Course Name: _____ |
| <input type="checkbox"/> Field 3 Arts | Course Name: _____ |
| <input type="checkbox"/> Field 4 History | Course Name: _____ |
| <input type="checkbox"/> Field 5 Social Sciences | Course Name: _____ |
| <input type="checkbox"/> CORE CAPSTONE | Course Name: _____ |
| <input type="checkbox"/> Diversity | Course Name: _____ |
| <input type="checkbox"/> Ethics | Course Name: _____ |
| <input type="checkbox"/> Global Awareness | Course Name: _____ |
| <input type="checkbox"/> Justice | Course Name: _____ |
| <input type="checkbox"/> Advanced Writing-intensive | Course Name: _____ |
| <input type="checkbox"/> Oral Communication | Course Name: _____ |

Biochemistry Track: Course Completion Checklist
MAJOR REQUIREMENTS

- | | |
|---|--|
| <input type="checkbox"/> CHM 111 + L _____ | <input type="checkbox"/> CHM 112 + L _____ |
| <input type="checkbox"/> BIO 111 + L _____ | <input type="checkbox"/> BIO 112 + L _____ |
| <input type="checkbox"/> MAT 111 _____ | <input type="checkbox"/> MAT 112 / 141 _____ |
| <input type="checkbox"/> PHY 201 + L _____ | <input type="checkbox"/> PHY 202 + L _____ |
| <input type="checkbox"/> CHM 227 + L _____ | <input type="checkbox"/> CHM 228 + L _____ |
| <input type="checkbox"/> CHM 244 _____ | <input type="checkbox"/> CHM 301 _____ |
| <input type="checkbox"/> CHM 334 + L or 430 + L _____ | |
| <input type="checkbox"/> BCH 301 + L _____ | <input type="checkbox"/> BCH 302 _____ |
| <input type="checkbox"/> CE or BCE or BE _____ | <input type="checkbox"/> BCE or BE2 _____ |
| <input type="checkbox"/> BIO 450 + L _____ | <input type="checkbox"/> CHM 381 _____ |
| <input type="checkbox"/> CHM 480 _____ | <input type="checkbox"/> CHM 481 _____ |

CORE REQUIREMENTS

- | | |
|---|----------------------------------|
| <input type="checkbox"/> ENG 111 | <input type="checkbox"/> ENG 112 |
| <input type="checkbox"/> PHI 101 | <input type="checkbox"/> RST 101 |
| <input type="checkbox"/> Field 1 Religious Studies and Theology | Course Name: _____ |
| <input type="checkbox"/> Field 2 Philosophy | Course Name: _____ |
| <input type="checkbox"/> Field 3 Arts | Course Name: _____ |
| <input type="checkbox"/> Field 4 History | Course Name: _____ |
| <input type="checkbox"/> Field 5 Social Sciences | Course Name: _____ |
| <input type="checkbox"/> CORE CAPSTONE | Course Name: _____ |
| <input type="checkbox"/> Diversity | Course Name: _____ |
| <input type="checkbox"/> Ethics | Course Name: _____ |
| <input type="checkbox"/> Global Awareness | Course Name: _____ |
| <input type="checkbox"/> Justice | Course Name: _____ |
| <input type="checkbox"/> Advanced Writing-intensive | Course Name: _____ |
| <input type="checkbox"/> Oral Communication | Course Name: _____ |

Biochemistry ACS Certified Track with Business Minor: Course Completion Checklist

MAJOR REQUIREMENTS

- | | |
|---|--|
| <input type="checkbox"/> CHM 111 + L _____ | <input type="checkbox"/> CHM 112 + L _____ |
| <input type="checkbox"/> BIO 111 + L _____ | <input type="checkbox"/> BIO 112 + L _____ |
| <input type="checkbox"/> MAT 111 _____ | <input type="checkbox"/> MAT 112 _____ |
| <input type="checkbox"/> PHY 223 + L _____ | <input type="checkbox"/> PHY 224 + L _____ |
| <input type="checkbox"/> CHM 227 + L _____ | <input type="checkbox"/> CHM 228 + L _____ |
| <input type="checkbox"/> CHM 244 _____ | <input type="checkbox"/> CHM 230 + L _____ |
| <input type="checkbox"/> CHM 301 + L _____ | <input type="checkbox"/> CHM 302 + L _____ |
| <input type="checkbox"/> BCH 301 + L _____ | <input type="checkbox"/> BCH 302 _____ |
| <input type="checkbox"/> CHM 334 + L or 430 + L _____ | <input type="checkbox"/> CHM 420 _____ |
| <input type="checkbox"/> BIO 450 + L _____ | <input type="checkbox"/> CHM 381 _____ |
| <input type="checkbox"/> CHM 480 _____ | <input type="checkbox"/> CHM 481 _____ |

MINOR REQUIREMENTS

- | | |
|--|--|
| <input type="checkbox"/> ECO 101 _____ | <input type="checkbox"/> ECO 102 _____ |
| <input type="checkbox"/> MGT 101 _____ | <input type="checkbox"/> MKT 201 _____ |
| <input type="checkbox"/> ACC 201 _____ | <input type="checkbox"/> FIN 201 _____ |
| <input type="checkbox"/> MAT 141 or ECO255 _____ | |

CORE REQUIREMENTS

- | | |
|---|----------------------------------|
| <input type="checkbox"/> ENG 111 | <input type="checkbox"/> ENG 112 |
| <input type="checkbox"/> PHI 101 | <input type="checkbox"/> RST 101 |
| <input type="checkbox"/> Field 1 Religious Studies and Theology | Course Name: _____ |
| <input type="checkbox"/> Field 2 Philosophy | Course Name: _____ |
| <input type="checkbox"/> Field 3 Arts | Course Name: _____ |
| <input type="checkbox"/> Field 4 History | Course Name: _____ |
| <input checked="" type="checkbox"/> Field 5 Social Sciences | Course Name: <u>ECO 101</u> |
| <input type="checkbox"/> CORE CAPSTONE | Course Name: _____ |

- Diversity
- Ethics
- Global Awareness
- Justice
- Advanced Writing-intensive
- Oral Communication

Course Name: _____

Course Name: _____

Course Name: _____

Course Name: _____

Course Name: _____

Course Name: _____

Biochemistry Track with Business Minor: Course Completion Checklist

MAJOR REQUIREMENTS

- | | |
|---|---|
| <input type="checkbox"/> CHM 111 + L _____ | <input type="checkbox"/> CHM 112 + L _____ |
| <input type="checkbox"/> BIO 111 + L _____ | <input type="checkbox"/> BIO 112 + L _____ |
| <input type="checkbox"/> MAT 111 _____ | <input type="checkbox"/> MAT 141 or ECO 255 _____ |
| <input type="checkbox"/> PHY 201 + L _____ | <input type="checkbox"/> PHY 202 + L _____ |
| <input type="checkbox"/> CHM 227 + L _____ | <input type="checkbox"/> CHM 228 + L _____ |
| <input type="checkbox"/> CHM 244 _____ | <input type="checkbox"/> CHM 301 _____ |
| <input type="checkbox"/> BCH 301 + L _____ | <input type="checkbox"/> BCH 302 _____ |
| <input type="checkbox"/> CHM 334 + L or 430 + L _____ | <input type="checkbox"/> BCE or BE2 _____ |
| <input type="checkbox"/> BIO 450 + L _____ | <input type="checkbox"/> CE or BCE or BE _____ |
| <input type="checkbox"/> CHM 381 _____ | <input type="checkbox"/> CHM 480 _____ |
| <input type="checkbox"/> CHM 481 _____ | |

MINOR REQUIREMENTS

- | | |
|--|--|
| <input type="checkbox"/> ECO 101 _____ | <input type="checkbox"/> ECO 102 _____ |
| <input type="checkbox"/> MGT 101 _____ | <input type="checkbox"/> MKT 201 _____ |
| <input type="checkbox"/> ACC 201 _____ | <input type="checkbox"/> FIN 201 _____ |

CORE REQUIREMENTS

- | | |
|---|----------------------------------|
| <input type="checkbox"/> ENG 111 | <input type="checkbox"/> ENG 112 |
| <input type="checkbox"/> PHI 101 | <input type="checkbox"/> RST 101 |
| <input type="checkbox"/> Field 1 Religious Studies and Theology | Course Name: _____ |
| <input type="checkbox"/> Field 2 Philosophy | Course Name: _____ |
| <input type="checkbox"/> Field 3 Arts | Course Name: _____ |
| <input type="checkbox"/> Field 4 History | Course Name: _____ |
| <input checked="" type="checkbox"/> Field 5 Social Sciences | Course Name: <u>ECO 101</u> |
| <input type="checkbox"/> CORE CAPSTONE | Course Name: _____ |

- Diversity
- Ethics
- Global Awareness
- Justice
- Advanced Writing-intensive
- Oral Communication

Course Name: _____

Course Name: _____

Course Name: _____

Course Name: _____

Course Name: _____

Course Name: _____