

CLARION UNIVERSITY OF PENNSYLVANIA
College of Arts, Education, and Sciences

DEGREE: B.S. Chemistry
Cooperative Engineering

Name _____
 Clarion ID _____
 Entrance Date _____
 Program Entry Date _____
 Advisor _____

Transfer:* _____
 ** _____
 CUP: _____

GENERAL EDUCATION REQUIREMENTS - 48 CREDITS
 Consult the Gen. Ed. Requirements for your Catalog Year for more specifics. (e.g. <http://www.clarion.edu/academics/registrar-office/for-students/index.html>)

- I. LIBERAL EDUCATION SKILLS - 12 CREDITS CR. GR.
- A. English Composition (3 credits)
 Eng 111: Writing II _____
- B. Mathematics Requirement (3 credits)

- C. Credits to total 12 in Category I, selected from at least two of the following: Academic Enrichment, MMAJ 140 or 340, Computer Information Science, CSD 465, Elementary Foreign Language, English Composition, Hon 128, Logic, Mathematics, & CMST

- II. LIBERAL KNOWLEDGE - 27 CREDITS
- A. **Physical & Biological Science** (9 credits) selected from at least two of the following: Biology, Chemistry, Earth Sci., ENVR275, GS411, HON230, Mathematics, Phys. Sci. & Physics.

- B. **Social & Behavioral Science** (9 credits) selected from at least two of the following: Anthropology, CSD125, CSD 257, Economics, Geography, GS 140, History, HON240, NURS320, Pol. Sci., Psychology, Social Work, Sociology & Women & Gender Studies.

- C. **Arts & Humanities** (9 credits) selected from at least two of the following: English Language and Literature, HON 130, Humanities, Intermediate Foreign Language and Cultures, Music, Philosophy, Speech and Theater.

- III. HEALTH AND PERSONAL PERFORMANCE - 3 CREDITS
- A. Health and Wellness (2 credits)

- B. Personal Performance (1 course and 1 credit)

- IV. GEN. ED. ELECTIVES - CREDITS TO TOTAL 48 FROM GEN. ED. Up to 1 credit from III.B.

V. REQUIREMENTS IN MAJOR: 45 CREDITS	<u>CR.</u>	<u>GR.</u>
A. Required in Chemistry (45 credits)		
CHEM 151: Chemical Principles I	3	_____
CHEM 161: Chemical Principles I (Lab)	1	_____
CHEM 152: Chemical Principles II	3	_____
CHEM 162: Chemical Principles II (Lab)	1	_____
CHEM 251: Organic Chemistry I	3	_____
CHEM 261: Organic Chemistry I (Lab)	1	_____
CHEM 252: Organic Chemistry II	3	_____
CHEM 262: Organic Chemistry II (Lab)	1	_____
CHEM 257: Organic Spectroscopy	3	_____
CHEM 265: Inorganic Chemistry I	3	_____
CHEM 266: Inorganic Chemistry I (Lab)	1	_____
CHEM 366: Inorganic Chemistry II	3	_____
CHEM 367: Inorganic Chemistry II (Lab)	1	_____
CHEM 353: Analytical Chemistry I	3	_____
CHEM 363: Analytical Chemistry I (Lab)	1	_____
CHEM 358: Analytical Chemistry II	3	_____
CHEM 368: Analytical Chemistry II (Lab)	1	_____
CHEM ____: ¹ _____		_____
CHEM ____: ¹ _____		_____
CHEM ____: ¹ _____		_____
CHEM ____: ¹ _____		_____

¹ Selection is limited to the following Chemistry courses: CHEM 354, 355, 364, 470 at Clarion; CHEM 141, 143, 148; ChE 85 at Pittsburgh.

- VI. FREE ELECTIVES (to bring total to ≥ 120 credits)

FLAGS - Record below: (see link above for info)	
_____ 1st Year Values (V)	_____ 2 nd Year Values (S)
_____ Quant. Reas. (Q)	_____ Info. Lit. (I)
_____ Writing Int. (W)	_____ Writing Int. (W)

PROGRAM NOTES:

- Chemistry/Co-Op Engineering majors are required to take MATH 270, 271, 272, 350, & 370 and Physics 258, 259, 268, 269 and may elect to place these courses under I. Liberal Education Skills or II. Liberal Knowledge.
- An American Chemical Society certified degree requires (1) foundational courses in the 5 subdisciplines; (2) in-depth courses in 4 of 5 subdisciplines; and (3) sufficient laboratory work to bring the total, post-introductory chemistry laboratory hours to 400 (9 total labs). These lab hours are achieved with CHEM labs, CHEM 257, BIOL 483, or courses consisting entirely of research that culminates in a comprehensive written report.

No changes since Spring 2015

SUGGESTED SCHEDULE OF COURSES and COURSE PLANNING GUIDE

DEGREE PROGRAM: B.S. CHEMISTRY: Cooperative Engineering (3 years at CUP)

FRESHMAN YEAR

Fall Semester	Spring Semester
CHEM 151 Chemical Prin. I (Lec); 3 CR	CHEM 152 Chemical Prin. II (Lec); 3 CR
CHEM 161 Chemical Prin. I Lab; 1 CR	CHEM 162 Chemical Prin. II Lab; 1 CR
MATH 171 Precalculus; 4 CR	MATH 270 Calculus I; 4 CR

Other courses/electives to consider for your Freshman year: **(1)** ENG 111- Writing II; **(2)** First Year Values Flag Course [[Go here for Gen. Ed. information <http://www.clarion.edu/academics/registrar-office/for-students/index.html>]; **(3)** Health and/or Personal Performance

SOPHOMORE YEAR

Fall Semester	Spring Semester
CHEM 251 Organic Chemistry I (Lec); 3 CR	CHEM 252 Organic Chemistry II (Lec); 3 CR
CHEM 261 Organic Chemistry I Lab; 1 CR †	CHEM 262 Organic Chemistry II Lab; 1 CR †
MATH 271 Calculus II; 4 CR	CHEM 265 Inorganic Chemistry I (Lec); 3 CR
	CHEM 266 Inorganic Chemistry I Lab; 1 CR †
PH 258 Intro. Physics I w/ lab (PH 268); 4 CR	PH 259 Intro. Physics II w/ lab (PH 269); 4 CR
	MATH 272 Calculus III; 4 CR

In addition to completing your Physics requirements, other courses/electives to consider for your Sophomore year: **(1)** Liberal Knowledge Gen. Ed. requirements; **(2)** Second Values Flag Course; **(3)** Health and/or Personal Performance.

JUNIOR YEAR

Fall Semester	Spring Semester
CHEM 353 Analytical Chemistry I (Lec); 3 CR	CHEM 358 Analytical Chemistry II (Lec); 3 CR
CHEM 363 Analytical Chemistry I Lab; 1 CR †	CHEM 368 Analytical Chemistry II Lab; 1 CR †
CHEM 366 Inorganic Chemistry II (Lec); 3 CR	CHEM 257 Organic Spectroscopy; 3 CR †
CHEM 367 Inorganic Chemistry II Lab; 1 CR †	MATH 370 Linear Algebra; 3 CR
MATH 350 Differential Equations; 3 CR	

Other courses/electives to consider for your Junior year: **(1)** Liberal Knowledge Gen. Ed. requirements; **(2)** Second Values Flag Course; **(3)** If relevant, look at pre-requisites for graduate/ professional school; **(4)** Offered alternate spring semesters: CHEM 359 Advanced Organic Chem. (Lec); 3 CR.; **(5)** If matriculating to Pitt, you can take CHEM 141, 143, 148, and ChE 85 to transfer back to CUP for Physical Chemistry and Seminar credit; **(6)** If matriculating to Pitt or Case, complete Gen. Eds and file a plan with your advisor for your transfers to complete ≥120 credits; **(7) Consider completing a Mathematics Minor with one more 3 credit math course >272.**

SENIOR YEAR (If completing the B.S. at Clarion)

Fall Semester	Spring Semester
CHEM 354 Physical Chemistry I (Lec); 3 CR	CHEM 355 Physical Chemistry II (Lec); 3 CR
CHEM 364 Physical Chemistry I Lab; 1 CR †	CHEM 470 Chemistry Seminar; 3 CR
BCHM 453 Biochemistry I (Lec); 3 CR (optional)	CHEM 466 Chemical Research; 1-3 CR † (optional)
BCHM 463 Biochemistry Lab; 1 CR † (optional)	
CHEM 465 Chemical Research; 1-3 CR † (optional)	

Other courses/electives to consider for your Senior year: **(1) APPLY FOR GRADUATION**; **(2)** Complete Gen. Eds and degree requirements; **(3)** Complete ≥120 credits; **(4)** BCHM 454 Biochemistry II (Lec); 3 CR; **(5)** Offered alternate spring semesters: CHEM 359 Advanced Organic Chem. (Lec); 3 CR.

American Chemical Society Certified Degree Option: In addition to what is specifically required for this degree, an American Chemical Society certified degree will require (1) a foundation course in biochemistry (BCHM 453) and (2) sufficient laboratory work to bring the total, post-introductory chemistry laboratory hours to 400 (9 total labs- CHEM 257 counts as one lab and each lab = 45 hrs. Lab courses counting towards the 400 hours are designated with †). The additional lab hours, beyond those indicated above, could come from BCHM 463 or courses consisting entirely of research that culminate in a comprehensive written report (such as CHEM 465/466).