CH2210 Organic Chemistry 3	John Carroll University Chemistry & Biochemistry Department										
Fall Semester	B.S. Chemistry with ACS certification Study Plan										
CH1430 General Chemistry 1	•										
CH1430 General Chemistry Lab	Fall Semester	Credits	Major	Core	Minor/Other	Spring Semester	Credits	Major	Core	Minor/Other	
NT1380 Calculus / Analytic Geometry	CH1410 General Chemistry *I	4	Χ			CH1420 General Chemistry II*	4	Х			
EN1250 Seminar on Academic Writing* 3	CH1430 General Chemistry Lab I*	1	Χ			CH1440 General Chemistry Lab II*	1	Х			
TRS 1XX or 2XX Course 3 X X Philosophy Values/Society (PLVS) 3 X X Total Credit Hours 15 Total Credit Hours 16 Total Credit Hours 16 Total Credit Hours 16 Total Credit Hours 17 Total Credit Hours 18	MT1350 Calculus / Analytic Geometry I	4	Χ			MT1360 Calculus / Analytic Geometry II	4	Х			
Total Credit Hours 15 Total Credit Hours 15 Total Credit Hours Second Year Second Year Fall Semester Credits Major Core Minor/Other CH2210 Organic Chemistry Lab I 1 X CH2230 Organic Chemistry Lab II 1 X X CH2230 Organic Chemistry Lab II 1 X X CH2330 Analytical Chemistry Lab (QA) 1 X X X PH1261 General Physics II 1 X X CH2330 Analytical Chemistry Lab II 1 X II Language Requirement 3 X X PH1261 General Physics II 1 X II Language Requirement 3 X X II Language Requirement 3 X X Total Credit Hours 15 Total Credit Hours 17 Total Credit Hours 18 Total Credit Hours 19 Total	EN1250 Seminar on Academic Writing*	3		Х		COM1251 Speech Communications	3		Х		
Second Year Spring Semester Credits Major Core Minor/Other Chasse Core Minor/Other Spring Semester Credits Major Core Minor/Other Chasse Core Minor/Other Chasse Core Minor/Other Chasse Core Minor/Other Chasse Core Minor/Other Spring Semester Credits Major Core Minor/Other Chasse Course Co	TRS 1XX or 2XX Course	3		Χ		Philosophy Values/Society (PLVS)	3		Χ		
Second Year Spring Semester Credits Major Core Minor/Other Chasse Core Minor/Other Spring Semester Credits Major Core Minor/Other Chasse Core Minor/Other Chasse Core Minor/Other Chasse Core Minor/Other Chasse Core Minor/Other Spring Semester Credits Major Core Minor/Other Chasse Course Co											
Second Year Spring Semester Credits Major Core Minor/Other Chasse Core Minor/Other Spring Semester Credits Major Core Minor/Other Chasse Core Minor/Other Chasse Core Minor/Other Chasse Core Minor/Other Chasse Core Minor/Other Spring Semester Credits Major Core Minor/Other Chasse Course Co											
Fall Semester	Total Credit Hours	15				Total Credit Hours	15				
CH2210 Organic Chemistry 3											
CH2230 Organic Chemistry Lab I	Fall Semester	Credits	Major	Core	Minor/Other	Spring Semester	Credits	Major	Core	Minor/Other	
PH1250 General Physics 3	CH2210 Organic Chemistry I					CH2220 Organic Chemistry II	3	Х			
PH1251 General Physics Lab 1	CH2230 Organic Chemistry Lab I	1	X			CH2240 Organic Chemistry Lab II	1	Х			
Engaging the Global Community (EGC) 3	PH1250 General Physics I	3	Χ			CH2610 Analytical Chemistry	3	Х			
Language Requirement 3 X	PH1251 General Physics Lab I	1	Χ			CH2630 Analytical Chemistry Lab (QA)	1	Χ	Х		
Creative and Performing Arts (CAPA) 1-3 X Language Requirement 3 X X Total Credit Hours 15 Third Year Stall Semester Credits Major Core Minor/Other Spring Semester Credits Major Core Minor CH3630 Physical Chemistry I A X CH3660 Physical Chemistry II A X CH3660 Physical Chemistry II A X CH3991 Undergraduate Research 1 X CH4780 Chemistry Seminar 0 X CH4780 Syminar 1 X CH4780 Chemistry Seminar 1 X CH4310 General Biochemistry 1 X Syminar 1 X Syminar 1 X CH4310 Instrumental Analysis 1 X Syminar 1 X Syminar 1 X CH4310 Instrumental Analysis 1 X Syminar	Engaging the Global Community (EGC)	3		Χ		PH1260 General Physics II	3	Х			
Total Credit Hours Third Year Fall Semester Credits Major Core Minor/Other Spring Semester Credits Major Core Minor/Other CH3660 Physical Chemistry I 3 X CH3660 Physical Chemistry II 3 X CH3660 Physical Chemistry II 3 X CH3992 Undergraduate Research 1 X CH3991 Undergraduate Research 1 X CH4780 Chemistry Seminar 0 X Philosophy Knowledge/Reality (PLKR) 3 X Career or Program Electives 6 X Issue in Social Justice Course (ISJ) 3 X CH4310 General Biochemistry 4 X Interview Credits Major Core Minor/Other Fourth Year Fourth Year Fourth Year Fall Semester Credits Major Core Minor/Other Fourth Year Fourth Year Fourth Year Fall Semester Credits Major Core Minor/Other CH4410 Instrumental Analysis Lab** 2 X CH4810 Inorganic Chemistry 3 X CH4820 Inorganic Chemistry 3 X CH4820 Inorganic Chemistry 3 X CH4820 Inorganic Chemistry 15 Total Credit Hours 16 If you are planning to attend graduate school, take the GRE in summer after 3rd year and begin submitting applications this fall. Total CH Credit Hours Required: 42 Total Credit Hours Required to Graduate: 120 Notes:	Language Requirement	3		Χ		PH1261 General Physics Lab II	1	Х			
Third Year Fall Semester Credits Major Core Minor/Other Spring Semester Credits Major Core Minor CH3630 Physical Chemistry I 3 X CH3660 Physical Chemistry I Lab 2 X CH3690 Physical Chemistry I Lab 2 X CH3992 Undergraduate Research 1 X CH3780 Chemistry Seminar 0 X CH3991 Undergraduate Research 1 X CH3991 Undergraduate Research 1 X CH3992 Undergraduate Research 1 X CH4780 Chemistry Seminar 0 X X I Research Philosophy Knowledge/Reality (PLKR) 3 X CH4780 Chemistry Seminar 0 X X I Research Philosophy Knowledge/Reality (PLKR) 3 X CH4310 General Biochemistry 4 X I Research I Seminary I Research I X CH4410 Instrumental Analysis Lab** 2 X CH4810 Inorganic Chemistry 3 X CH4810 Inorganic Chemistry 3 X CH4810 Inorganic Chemistry Lab 1 X CH4820 Inorganic Chemistry Lab 1 X Total Credit Hours 15 In Journal Credit Hours 16 Inorganic Chemistry Lab 1 X Inordal Credit Hours 16	Creative and Performing Arts (CAPA)	1-3		Χ		Language Requirement	3		Χ		
Fall Semester Credits Major Core Minor/Other CH3630 Physical Chemistry I 3 X CH3660 Physical Chemistry II 3 X CH3670 Physical Chemistry I Lab 2 X CH3992 Undergraduate Research 1 X CH3991 Undergraduate Research 1 X CH3991 Undergraduate Research 1 X CH4780 Chemistry Seminar 0 X Philosophy Knowledge/Reality (PLKR) 3 X Career or Program Electives 6 X X INSA Course 3 X Course 3 X CH4310 General Biochemistry 4 X CH4310 General Biochemistry 4 X CH4310 General Biochemistry 4 X CH4410 Instrumental Analysis 3 X CH4430 Instrumental Analysis 13 X CH4430 Instrumental Analysis 2 X CH4310 Inorganic Chemistry 3 X CH4430 Instrumental Analysis 2 X CH4430 Instrumental Analysis 2 X CH4430 Instrumental Analysis 2 X CH4430 Instrumental Analysis 3 X CH4430 Instrumental Analysis Career 3 X CH4430 Inorganic Chemistry 3 X CH4810 Inorganic Chemistry 3 X CH4810 Inorganic Chemistry 4 X CH4820 Inorganic Chemistry 5	Total Credit Hours	15				Total Credit Hours	15				
CH3630 Physical Chemistry I 3 X CH3660 Physical Chemistry II 3 X CH3670 Physical Chemistry I Lab 2 X CH3992 Undergraduate Research 1 X CH3991 Undergraduate Research 1 X CH4780 Chemistry Seminar 0 X Philosophy Knowledge/Reality (PLKR) 3 X Career or Program Electives 6 X X TRS 3XX Course 3 X Linked Pair of Courses 6 X Issue in Social Justice Course (ISJ) 3 X CH4310 General Biochemistry 4 X Total Credit Hours 15 Total Credit Hours 17 Fourth Year Fall Semester Credits Major Core Minor/Other Spring Semester Credits Major Core Minor CH4410 Instrumental Analysis 3 X CH4301 Instrumental Analysis 3 X CH4393 Undergraduate Research 1 X CH4303 Undergraduate Research 1 X CH4301 Instrumental Analysis Course 3 X CH4810 Inorganic Chemistry 3 X CH4820 Inorganic Chemistry 1 X CH4820 Inorganic Chemistry 1 X CH4820 Inorganic Chemistry Lab 1 X Social Sciences Course 3 X X CH4820 Inorganic Chemistry Lab 1 X Social Sciences Course 3 X X TOTAL Credit Hours 16 Instrumental Graduate School, take the GRE in summer after 3rd year and begin submitting applications this fall. Total CH Credit Hours Required: 42 Total Credit Hours Required to Graduate: 120 Notes:	Third Year										
CH3670 Physical Chemistry I Lab CH3991 Undergraduate Research 1 X CH3991 Undergraduate Research 1 X CH4780 Chemistry Seminar 0 X Philosophy Knowledge/Reality (PLKR) 3 X Career or Program Electives 6 X X TRS 3XX Course 3 X Linked Pair of Courses 6 X Issue in Social Justice Course (ISJ) 3 X CH4310 General Biochemistry 4 X Total Credit Hours 17 Career or Program Electives 17 Total Credit Hours 17 Total Credit Hours 17 Career or Program Electives 9 X CH4410 Instrumental Analysis 3 X CH4430 Instrumental Analysis Lab** 2 X CH4810 Inorganic Chemistry 3 X CH4810 Inorganic Chemistry 3 X Humanities Course 3 X CH4810 Inorganic Chemistry 3 X CH4810 Inorganic Chemistry 3 X CH4820 Inorganic Chemistry 3 X CH4820 Inorganic Chemistry Lab 1 X Social Sciences Course 3 X CH4820 Inorganic Chemistry Lab 1 X Social Sciences Course 3 X CH4820 Inorganic Chemistry Lab 1 X Social Sciences Course 3 X CH4820 Inorganic Chemistry Lab 1 X Social Sciences Course 3 X CH4820 Inorganic Chemistry Lab 1 X Social Sciences Course 3 X CH4820 Inorganic Chemistry Lab 1 X Social Sciences Course 3 X CH4820 Inorganic Chemistry Lab 1 X Social Sciences Course 3 X CH4820 Inorganic Chemistry Lab 1 X Social Sciences Course 3 X CH4820 Inorganic Chemistry Lab 1 X Social Sciences Course 3 X CH4820 Inorganic Chemistry Lab 1 X Social Sciences Course 3 X CH4820 Inorganic Chemistry Lab 1 X Social Sciences Course 3 X CH4820 Inorganic Chemistry Lab 1 X Social Sciences Course 3 X CH4820 Inorganic Chemistry Lab 1 X Social Sciences Course 3 X CH4820 Inorganic Chemistry Lab 1 X Social Sciences Course 3 X CH4820 Inorganic Chemistry Lab 1 X Social Sciences Course 3 X CH4820 Inorganic Chemistry Lab 1 X Social Sciences Course 3 X CH4820 Inorganic Chemistry Lab 1 X Social Sciences Course 3 X CH4820 Inorganic Chemistry Lab 1 X Social Sciences Course 3 X CH4820 Inorganic	Fall Semester	Credits	Major	Core	Minor/Other	Spring Semester	Credits	Major	Core	Minor/Other	
CH3991 Undergraduate Research 1 X CH4780 Chemistry Seminar 0 X Philosophy Knowledge/Reality (PLKR) 3 X Career or Program Electives 6 X X TRS 3XX Course 3 X Linked Pair of Courses 6 X Issue in Social Justice Course (ISJ) 3 X CH4310 General Biochemistry 4 X Total Credit Hours 15 Total Credit Hours 17 Fourth Year Fall Semester Credits Major Core Minor/Other Spring Semester Credits Major Core Minor/Other Spring Semester CH4410 Instrumental Analysis Lab** 2 X CH Elective 3 X CH4830 Inorganic Chemistry 3 X CH4993 Undergraduate Research 1 X CH4810 Inorganic Chemistry 3 X CH4993 Undergraduate Research 1 X CH4810 Inorganic Chemistry 3 X CH4993 Undergraduate Research 1 X CH4820 Inorganic Chemistry 1 X CH4820 Inorganic Chemistry Lab 1 X CH Elective or Career Elective 3 X X CH Elective or Career Elective 3 X X CH4820 Inorganic Chemistry Lab 1 Total Credit Hours 16 If you are planning to attend graduate school, take the GRE in summer after 3rd year and begin submitting applications this fall. Total CH Credit Hours Required: 42 Total Credit Hours Required to Graduate: 120 Notes:	CH3630 Physical Chemistry I	3	Χ			CH3660 Physical Chemistry II	3	Х			
Philosophy Knowledge/Reality (PLKR) 3 X Course SXX Cour	CH3670 Physical Chemistry I Lab	2	Χ			CH3992 Undergraduate Research	1	Х			
TRS 3XX Course 3 X Linked Pair of Courses 6 X Issue in Social Justice Course (ISJ) 3 X CH4310 General Biochemistry 4 X Total Credit Hours 15 Total Credit Hours 17 Total Credit Hours 17 Total Credit Hours 18 X Career or Program Electives 9 X CH4410 Instrumental Analysis 19 X CH4430 Instrumental Analysis Lab** 2 X CH4810 Inorganic Chemistry 3 X CH4810 Inorganic Chemistry 3 X CH4810 Inorganic Chemistry 19 X CH4810 Inorganic Chemistry 19 X CH4810 Inorganic Chemistry 10 X CH4820 Inorganic Chemistry 10 X CH482	CH3991 Undergraduate Research	1	Χ			CH4780 Chemistry Seminar	0	Χ			
Issue in Social Justice Course (ISJ) 3 X CH4310 General Biochemistry 4 X Total Credit Hours 15 Total Credit Hours 17 Fourth Year Fall Semester Credits Major Core Minor/Other Spring Semester Credits Major Core Minor CH4410 Instrumental Analysis 3 X CH4430 Instrumental Analysis Lab** 2 X CH Elective 3 X CH3993 Undergraduate Research 1 X CH4810 Inorganic Chemistry 3 X CH3993 Undergraduate Research 1 X CH4810 Inorganic Chemistry 3 X CH4820 Inorganic Chemistry 1 X CH4820 Inorganic Chemistry 1 X CH4820 Inorganic Chemistry Lab 1 X CH4820 Inorganic Chemistry Lab 1 X CH4820 Inorganic Chemistry Lab 1 X Inotal Credit Hours 15 Total Credit Hours 16 In Summer after 3rd year and begin submitting applications this fall. Total Credit Hours Required: 42 Total Credit Hours Required to Graduate: 120 Notes:	Philosophy Knowledge/Reality (PLKR)	3		Х		Career or Program Electives	6	Х	Х		
Total Credit Hours Fourth Year Fall Semester Credits Major Core Minor/Other Spring Semester Credits Major Core Minor CH4410 Instrumental Analysis 3 X CH4430 Instrumental Analysis Lab** 2 X CH Elective 3 X CH4810 Inorganic Chemistry 3 X CH4820 Inorganic Chemistry	TRS 3XX Course	3		Х		Linked Pair of Courses	6		Х		
Fall Semester Credits Major Core Minor/Other Spring Semester Credits Major Core Minor CH4410 Instrumental Analysis 3 X Career or Program Electives 9 X CH4430 Instrumental Analysis Lab** 2 X CH Elective 3 X CH4810 Inorganic Chemistry 3 X CH3993 Undergraduate Research 1 X CH4810 Inorganic Chemistry 3 X CH4820 Inorganic Chemistry 4 X CH4820 Inorganic Chemistry Lab 1 X CH4820 Inorganic Chemistry Lab 1 X CH Elective or Career Elective 3 X X CH Elective or Career Elective 3 X X Total Credit Hours 15 Total Credit Hours 16 If you are planning to attend graduate school, take the GRE in summer after 3rd year and begin submitting applications this fall. Total Credit Hours Required: 42 Total Credit Hours Required to Graduate: 120 Notes:	Issue in Social Justice Course (ISJ)	3		Χ		CH4310 General Biochemistry	4	Χ			
Fall Semester Credits Major Core Minor/Other Spring Semester Credits Major Core Minor CH4410 Instrumental Analysis 3 X Career or Program Electives 9 X CH4430 Instrumental Analysis Lab** 2 X CH Elective 3 X CH4810 Inorganic Chemistry 3 X CH3993 Undergraduate Research 1 X CH4810 Inorganic Chemistry 3 X CH4820 Inorganic Chemistry 4 X CH4820 Inorganic Chemistry Lab 1 X CH4820 Inorganic Chemistry Lab 1 X CH Elective or Career Elective 3 X X CH Elective or Career Elective 3 X X Total Credit Hours 15 Total Credit Hours 16 If you are planning to attend graduate school, take the GRE in summer after 3rd year and begin submitting applications this fall. Total Credit Hours Required: 42 Total Credit Hours Required to Graduate: 120 Notes:											
Fall Semester Credits Major Core Minor/Other Spring Semester CH4410 Instrumental Analysis 3 X Career or Program Electives 9 X CH4430 Instrumental Analysis Lab** 2 X CH Elective CH3993 Undergraduate Research 1 X CH4810 Inorganic Chemistry 3 X Humanities Course 3 X CH4820 Inorganic Chemistry Lab 1 X Social Sciences Course 3 X X CH Elective or Career Elective 3 X X Total Credit Hours 15 Total Credit Hours 16 If you are planning to attend graduate school, take the GRE in summer after 3rd year and begin submitting applications this fall. Total Credit Hours Required: 42 Total Credit Hours Required to Graduate: 120 Notes:	Total Credit Hours	15				Total Credit Hours	17				
CH4410 Instrumental Analysis 3 X Career or Program Electives 9 X CH4430 Instrumental Analysis Lab** 2 X CH Elective 3 X CH3993 Undergraduate Research 1 X CH4810 Inorganic Chemistry 3 X Humanities Course 3 X CH4820 Inorganic Chemistry Lab 1 X Social Sciences Course 3 X X CH Elective or Career Elective 3 X X Total Credit Hours 15 Total Credit Hours 16 If you are planning to attend graduate school, take the GRE in summer after 3rd year and begin submitting applications this fall. Total Credit Hours Required: 42 Total Credit Hours Required to Graduate: 120 Notes:	Fourth Year										
CH4430 Instrumental Analysis Lab** CH3993 Undergraduate Research 1 X CH4810 Inorganic Chemistry 3 X Humanities Course 3 X CH4820 Inorganic Chemistry Lab 1 X Social Sciences Course 3 X CH Elective or Career Elective 3 X X Total Credit Hours 15 Total Credit Hours 16 If you are planning to attend graduate school, take the GRE in summer after 3rd year and begin submitting applications this fall. Total Credit Hours Required: 42 Total Credit Hours Required to Graduate: 120 Notes:	Fall Semester	Credits	Major	Core	Minor/Other	Spring Semester	Credits	Major	Core	Minor/Other	
CH3993 Undergraduate Research 1 X CH4810 Inorganic Chemistry 3 X Humanities Course 3 X CH4820 Inorganic Chemistry Lab 1 X Social Sciences Course 3 X CH Elective or Career Elective 3 X X Total Credit Hours 15 Total Credit Hours 16 If you are planning to attend graduate school, take the GRE in summer after 3rd year and begin submitting applications this fall. Total CH Credit Hours Required: 42 Total Credit Hours Required to Graduate: 120 Notes:	CH4410 Instrumental Analysis	3	Х			Career or Program Electives	9	Х			
Humanities Course 3 X CH4820 Inorganic Chemistry Lab 1 X Social Sciences Course 3 X X CH Elective or Career Elective 3 X X Total Credit Hours 15 Total Credit Hours 16 If you are planning to attend graduate school, take the GRE in summer after 3rd year and begin submitting applications this fall. Total CH Credit Hours Required: 42 Total Credit Hours Required to Graduate: 120 Notes:	CH4430 Instrumental Analysis Lab**	2				CH Elective	3	Χ			
Social Sciences Course 3 X CH Elective or Career Elective 3 X X Total Credit Hours 15 Total Credit Hours 16 If you are planning to attend graduate school, take the GRE in summer after 3rd year and begin submitting applications this fall. Total CH Credit Hours Required: 42 Total Credit Hours Required to Graduate: 120 Notes:	CH3993 Undergraduate Research	1	Х			CH4810 Inorganic Chemistry	3	Х			
CH Elective or Career Elective 3 X X Total Credit Hours 15 If you are planning to attend graduate school, take the GRE in summer after 3rd year and begin submitting applications this fall. Total CH Credit Hours Required: 42 Total Credit Hours Required to Graduate: 120 Notes:	Humanities Course					CH4820 Inorganic Chemistry Lab	1	Χ			
Total Credit Hours 15 Total Credit Hours 16 If you are planning to attend graduate school, take the GRE in summer after 3rd year and begin submitting applications this fall. Total CH Credit Hours Required: 42 Total Credit Hours Required to Graduate: 120 Notes:	Social Sciences Course	3		Х							
If you are planning to attend graduate school, take the GRE in summer after 3rd year and begin submitting applications this fall. Total CH Credit Hours Required: 42 Total Credit Hours Required to Graduate: 120 Notes:	CH Elective or Career Elective		Χ	Χ							
year and begin submitting applications this fall. Total CH Credit Hours Required: 42 Total Credit Hours Required to Graduate: 120 Notes:						Total Credit Hours	16				
Total CH Credit Hours Required: 42 Total Credit Hours Required to Graduate: 120 Notes:											
Notes:											
	·										
*Well prepared students may substitute the CH1410/1430 sequence with CH1510/1530 - Chemical Principles and Lab in the Fall Semester.		CH1/10	/1/30 -	oguon	co with CH1510	/1530 Chamical Principles and Lab in the Ea	II Somoo	tor			
**CH4430 will satisfy the Core Requirements for Capstone, Advanced Writing and Oral Presentation within the major (CAP, AW, OP)								iei.			
*Please consult your academic advisor to address specific needs of your major, minor, and/or concentration.											