

College of Arts and Sciences Department of Chemistry & Biochemistry Bulletin Year: 2019-2020

This course plan is a recommended sequence for this major. Courses designated as critical (!) may have a deadline for completion and/or affect time to graduation. Please see the

emester Dos (17-18 Genetal Hours)    ENCEL 1016 resical Reading and Composition   5   C   C-C-CMW     MATH 141 Calculus 13   4   C   C-RP   Math 112/115/116 or Math placement test	Critical	,	Credit		Major	Code	Prerequisites	Notes
MATH 141 Calculus 11	Semeste					00 01 mm		
CHEM 111 General Chemistry I	!			C				
CHEM 111L General Chemistry LLab								
CHEM 1111. General Chemistry I Lab		CHEM 111 General Chemistry 1*	3	C		PK	, , ,	
CHEM 111. General Chemistry   Lab   1								
Foreign languages or other Carolina Core Requirement   3-4   C.G.G.H.		CHEM 1111 Committee LL-1	1	C		DD		
CNIV 101 The Student in the University or Carolina Gore Requirement*			_	C			Cofeq: CHEM III	
Performance								
			3			PK/CC		
ENGL 102 Rhetoric and Composition	Semeste							
MATH 142 Calculus II	)	FNGL 102 Rhetoric and Composition	3	C		CC-CMW		
MATH 142 Calculus II	٠	ENGL 102 Rictoric and Composition						
CHEM 112 General Chemistry II		MATH 142 Calculus II	4				MATH 141	
higher math; Prercy or Corecy, MATH 122, 141 or bigher & CHEM 1121.	1			С				
CHEM 1121. General Chemistry II 1ab	•	OTIEM 112 Octions Ottomory 11					higher math; Prereq or Coreq: MATH 122,	
PHYS 211		CHEM 112L General Chemistry II Lab	1	С		PR		
PHYS 211. Essentials of Physics I Lab			3		1	CC-SCI		
Foreign language* or other Carolina Core Requirement*   3					1			
MATH 24 Vector Calculus*   Section			3			CC-GFL	•	
MATH 241 Vector Calculus?  CHEM 333 Organic Chemistry I  CHEM 333 Organic Chemistry I I ab  PR CHEM 112 or CHEM 142  CHEM 333 Organic Chemistry I Lab  2	emeste							
CHEM 333L Organic Chemistry Lab  PHYS 212 Essentials of Physics II			3			PR	MATH 142	
CHEM 333L Organic Chemistry Lab  PHYS 212 Essentials of Physics II		CHEM 333 Organic Chemistry I	3	С		MR	CHEM 112 or CHEM 142	
PHYS 212L Essentials of Physics II Lab <sup>7</sup> Poreign language* or Carolina Core Requirement*    CC-SCI		CHEM 333L Organic Chemistry I Lab	2	С		MR		
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CHEM 322 Analytical Chemistry  CHEM 322 Analytical Chemistry  CHEM 322 Lonalytical Chemistry Lab  CHEM 322 Lonalytical Chemistry Lab  CHEM 322 Lonalytical Chemistry Lab  CHEM 334 Organic Chemistry II Lab  CAROlina Core Requirement <sup>6</sup> (only if needed to meet Core requirements)  CHEM 541 Organic Chemistry (rous-listed: BIOL 541)  Or CHEM 550 Biochemistry (rous-listed: BIOL 541)  Or CHEM 551 Bioch/Mol. Bio. I (rross-listed: BIOL 545)  CHEM 541 Or CHEM 542 Physical Chemistry  CHEM 541 Or CHEM 542 Physical Chemistry Lab  CHEM 541L Or CHEM 542 Physical Chemistry Lab  CHEM 541L Or CHEM 542 Physical Chemistry Lab  CHEM 541L Or CHEM 542 Physical Chemistry Lab  COgnate or Minor Course <sup>7</sup> or Approved Elective <sup>10</sup> Cognate or Minor Course <sup>7</sup> or Approved Elective <sup>10</sup> CHEM 621 Instrumental Analysis  CHEM 621 Instrumental Analysis Lab  CHEM 541L Or CHEM 542 Physical Chemistry  CHEM 541L Or CHEM 542 Physical Chemistry  CHEM 541 Or CHEM 542 Physical Chemistry  COgnate or Minor Course <sup>7</sup> or Approved Elective <sup>10</sup> COgnate or Minor Course <sup>7</sup> or Approved Elective <sup>10</sup> COgnate or Minor Course <sup>7</sup> or Approved Elective <sup>10</sup> COgnate or Minor Course <sup>7</sup> or Approved Elective <sup>10</sup> COgnate or Minor Course <sup>7</sup> or Approved Elective <sup>10</sup> COgnate or Minor Course <sup>7</sup> or Approved Elective <sup>10</sup> COgnate or Minor Course <sup>7</sup> or Approved Elective <sup>10</sup>		PHYS 212L Essentials of Physics II Lab <sup>7</sup>	1			CC-SCI	PHYS 212	
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or CHEM 555 Bioch/Mol. Bio. I (cross-listed: BIOL 545)  CHEM 541 or CHEM 542 Physical Chemistry  3 C MR  See Bulletin listing.  CHEM 541L or CHEM 542L Physical Chemistry Lab  2 C MR/CC- INT  STAT 509 Statistics for Engineers or STAT 515 Statistical Methods I <sup>7 &amp; 9</sup> (only if needed)  Cognate or Minor Course <sup>7</sup> or Approved Elective <sup>10</sup> Cognate or Fine Arts  CHEM 621 Instrumental Analysis  CHEM 621 Instrumental Analysis Lab  CHEM 541L or CHEM 542 Physical Chemistry  CHEM 541L or CHEM 542 Physical Chemistry  CHEM 541L or CHEM 542 Physical Chemistry  COgnate or Minor Course <sup>7</sup> or Approved Elective <sup>10</sup> CHEM 541L or CHEM 542 Physical Chemistry  CHEM 541L or CHEM 542 Physical Chemistry  COgnate or Minor Course <sup>7</sup> or Approved Elective <sup>10</sup> COgnate or Minor Course <sup>7</sup> or Approved Elective <sup>10</sup> COgnate or Minor Course <sup>7</sup> or Approved Elective <sup>10</sup> COgnate or Minor Course <sup>7</sup> or Approved Elective <sup>10</sup> COgnate or Minor Course <sup>7</sup> or Approved Elective <sup>10</sup> COgnate or Minor Course <sup>7</sup> or Approved Elective <sup>10</sup> COgnate or Minor Course <sup>7</sup> or Approved Elective <sup>10</sup> COgnate or Minor Course <sup>7</sup> or Approved Elective <sup>10</sup> COGNATE See Bulletin listing.	emeste							
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Humanities or Fine Arts  3 CR  emester Six (15 Credit Hours)  CHEM 621 Instrumental Analysis  CHEM 621L Instrumental Analysis Lab  CHEM 621L Instrumental Analysis Lab  CHEM 541 or CHEM 542 Physical Chemistry  CHEM 541L or CHEM 542L Physical Chemistry Lab  CHEM 541L or CHEM 542L Physical Chemistry Lab  COgnate or Minor Course or Approved Elective 10  3 C (minor)  PR		Cognate or Minor Course? or Approved Elective 10	3	C (minos	1	DR	statistics class (31711 )1) uttyj	
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CHEM 621 Instrumental Analysis  CHEM 621L Instrumental Analysis Lab  CHEM 621L Instrumental Analysis Lab  CHEM 541 or CHEM 542 Physical Chemistry  CHEM 541L or CHEM 542L Physical Chemistry Lab  CHEM 541L or CHEM 542L Physical Chemistry Lab  COgnate or Minor Course <sup>7</sup> or Approved Elective <sup>10</sup> CHEM 541 Instrumental Analysis  CHEM 521	emeste		<i>J</i>			ÇIÇ.		
CHEM 621L Instrumental Analysis Lab  CHEM 541 or CHEM 542 Physical Chemistry  CHEM 541L or CHEM 542L Physical Chemistry Lab  CHEM 541L or CHEM 542L Physical Chemistry Lab  COgnate or Minor Course or Approved Elective 10  CHEM 541L or CHEM 542L Physical Chemistry Lab  COGnate or Minor Course or Approved Elective 10  CHEM 541L or CHEM 542L Physical Chemistry Lab  COGNATION OF THE	omesic		3	C		MR	CHEM 322	
CHEM 541 or CHEM 542 Physical Chemistry  3 C MR See Bulletin listing.  CHEM 541L or CHEM 542L Physical Chemistry Lab 2 C MR/CC- INT  Cognate or Minor Course or Approved Elective 10 3 C (minor) PR		,			-			
CHEM 541L or CHEM 542L Physical Chemistry Lab 2 C MR/CC- See Bulletin listing.  INT  Cognate or Minor Course or Approved Elective 10 3 C (minor) PR					-			
Cognate or Minor Course <sup>7</sup> or Approved Elective <sup>10</sup> 3 C (minor) PR		,						
		,				INT	See Duiletin listing.	
Wanter Care Damenage to		Carolina Core Requirement <sup>6</sup>	3	C (minor)	1	CC PR		

Semester Seven (12-15 Credit Hours)							
CHEM 511 Inorganic Chemistry	3	С		MR	CHEM 334, PHYS 212, & MATH 241		
Cognate or Minor Course <sup>7</sup> or Approved Elective <sup>10</sup>	3	C (minor)		PR			
Cognate or Minor Course <sup>7</sup> or Approved Elective <sup>10</sup>	3	C (minor)		PR			
Social Science	3			CR			
Carolina Core Requirement <sup>6</sup> (only if needed to meet Core	0-3			CC			
requirements)							
Semester Eight (12-16 Credit Hours)	Semester Eight (12-16 Credit Hours)						
CHEM 496-499 Undergraduate Research <sup>11</sup>	3	С		MR	Independent Study Contract Required		
Minor Course <sup>7</sup> or Approved Elective <sup>10</sup>	3	C (minor)		PR			
Minor Course <sup>7</sup> or Approved Elective <sup>10</sup>	3	C (minor)		PR			
CSCE 206 Scientific Applications Programming	3-4			CR	MATH 122 or 141 (CSCE 206 only); Prereq		
or CSCE 145 Algorithmic Design I					or Coreq: MATH 111 <i>or</i> 115 <i>(CSCE 145</i>		
					only)		
Carolina Core Requirement <sup>6</sup> (only if needed to meet Core requirements)	0-3			CC			

**Graduation Requirements Summary** 

Minimum Total Hours	Minimum Major Requirements Hours	College & Program Requirements Hours	(arolina Core Hours)	
120	37	44-50	34-40	2.000

- 1. Regardless of individual course grades, students must maintain a minimum 2.000 cumulative GPA.
- 2. Some colleges require a minimum GPA for major courses. Courses indicated in this column are included in the major GPA for this program of study.
- 3. Students who do not place into MATH 141 will be required to successfully complete MATH 112, 115, or 116 before taking MATH 141.
- 4. CHEM 141 may be taken in place of CHEM 111 and CHEM 111L, and CHEM 142 may be taken in place of CHEM 112 and CHEM 112L.
- 5. Students in the College of Arts and Sciences are required to demonstrate proficiency in one foreign language equivalent to the 122 course through course credit or the corresponding foreign language placement score.
- 6. The Carolina Core provides the common core of knowledge, skill and academic experience for all Carolina undergraduate students.
- 7. The cognate is intended to support the course work in the major. The cognate must consist of twelve hours of courses at the advanced level, outside of, but related to the major. In place of a cognate, a student may choose a minor consisting of at least 18 credit hours of courses concentrated in one area that follow a structured sequence. A second major eliminates the minor/cognate requirement. Students may use MATH 241 & higher math, STAT 509/515, and PHYS 212 and 212L to fulfill the cognate requirement, but would need to complete additional electives to meet hours to graduate.
- 8. The College of Arts and Sciences requires one U.S. History and one non-U.S. History course, both of which must be chosen from the approved Carolina Core GHS courses. Whichever is not fulfilled through the Carolina Core GHS requirement must be fulfilled through this college requirement.
- 9. If CHEM 111, 112, 322, and 322L (or CHEM 141, 142, 322, and 322L) are all completed at USC, STAT 509 or 515 is not required. Also, if CHEM 621 and 621L are completed at USC, STAT 509 or 515 is not required. Students who exempt STAT 509 or 515 through this process will be required to take an approved elective to reach minimum hours for graduation.
- 10. No courses of a remedial, developmental, skill-acquiring, or vocational nature may apply as credit toward degrees in the College of Arts and Sciences. The College of Arts and Sciences allows the use of the Pass-Fail option on elective courses. Further clarification on inapplicable courses can be obtained from the College of Arts and Sciences.
- 11. Students are encouraged to start undergraduate research as early as possible to allow participation in long-term projects. Three credits of undergraduate research are required, but additional research experience is recommended. Extramural Research opportunities, such as REU's may qualify for CHEM 496-499 credit; however, a request form must be submitted and preapproved by the Department of Chemistry. If the undergraduate research is not in an approved area of biochemistry or inorganic chemistry, CHEM 550L Biochemistry Laboratory must also be taken.

## **Program Notes:**

- ENGL 101 and ENGL 102 must be completed in the student's first 60 semester hours of work in order for these courses to be credited toward graduation. CHEM 112 is a prerequisite for subsequent required courses and may delay progression if not taken in a timely manner.
- The course requirements for the B.S.C. in Chemistry degree automatically meet qualifications for ACS certification.
- CHEM 401 Industrial Chemistry Capstone Experience is a recommended elective that prepares students for future roles in chemistry.
- Chemistry majors may enroll in a chemistry course a maximum of twice to earn the required grade of C or higher.
- A Chemistry major must receive a grade of C or higher in any chemistry course in order for it to be used to satisfy a major requirement.
- The last 30 credit hours toward your degree must be earned in residence at the University of South Carolina-Columbia.

**University Requirements:** Bachelor's degree-seeking students must meet Carolina Core (general education) requirements. For more information regarding these requirements, please visit the <u>Carolina Core</u> page on the University website.

Codes:						
CC	Carolina Core	CC-INF	Carolina Core – Information Literacy			
CC-AIU	Carolina Core-Aesthetic and Interpretive Understanding	CC-INT	Carolina Core – Integrative Course			
CC-ARP	Carolina Core-Analytical Reasoning and Problem-Solving	CC-SCI	Carolina Core – Scientific Literacy			
CC-CMS	Carolina Core-Effective, Engaged, and Persuasive Communication: Spoken Component	CC-VSR	Carolina Core – Values, Ethics, and Social Responsibility			
CC-CMW	Effective, Engaged, and Persuasive Communication: Written Component	CR	College Requirement			
CC-GFL	Carolina Core-Global Citizenship and Multicultural Understanding: Foreign Language	MR	Major Requirement			
CC-GHS	Carolina Core – Historical Thinking	PR	Program Requirement			
CC-GSS	Carolina Core – Social Sciences					

Disclaimer: Major maps are only a suggested or recommended sequence of courses required in a program of study. Please contact your academic advisor for assistance in the application of specific coursework to a program of study and course selection and planning for upcoming semesters.