COLLEGE OF ARTS AND SCIENCES

CHEMISTRY

Faculty

- Frank Black
- Robyn Hyde
- Jessica Johnston (Chair)

Program Goals

Content: Students will identify, apply, and analyze concepts across a broad spectrum of chemical disciplines, and use evidence to evaluate interpretations and draw conclusions.

Collaboration: Students will actively engage with their peers in small learning teams to collect and process information, exchange ideas, and synthesize knowledge in order to achieve collective goals in a respectful team environment.

Laboratory: Students will design and carry out experiments utilizing modern instruments and techniques. Students will interpret their results and revise experiments based upon the information they learn.

Communication: Students will communicate chemistry-related concepts, experimental results, and conclusions in written, visual, and oral formats to scientists and non-scientists.

Civic Responsibility: Students will develop a global perspective on chemistry issues and engage in practices informed by social responsibility across the spectrum of differences.

Objectives

The Chemistry program offers an academic major leading to a Bachelor of Science degree and an academic minor. The program provides: (1) preparation for a professional career or graduate study in chemistry; (2) an understanding of basic chemistry concepts and experience in laboratory operations for those planning careers in related fields; (3) pre-professional study for those preparing for careers in medicine, dentistry, veterinary medicine, and nursing; and (4) preparation for those who wish to teach at the secondary level.

Program Requirements

Students must maintain a cumulative 2.3 GPA or better in courses required in the academic major. Students choosing a double major or minor within the science program may not apply electives to more than one major or minor. Only classes listed under "required courses" that coincide between both majors/minors may be applied to both. Students must meet the university-wide graduation requirements in addition to the Chemistry major:

- 124 total hours
- 30 upper division hours
- WCore or Honors College requirements

Chemistry Major

To fulfill the requirements for a major in Chemistry, students must complete the following as well as demonstrate competency in MATH 144:

Requirement Description	Credit Hours	Prerequisites
I. World Language Requirement	**8**	
Chemistry majors must complete eight credit hours in a single world language.		
II. Lower Division Courses	**8**	
CHEM 111 Principles of Chemistry I and Lab	4	Pre- or co-requisite MATH 144
CHEM 112 Principles of Chemistry II and Lab	4	CHEM 111
III. Upper Division Courses	**24**	
CHEM 303 Organic Chemistry I	3	CHEM 112 Recommended pre-/co-requisite: CHEM 303L
CHEM 303L Organic Chemistry I Lab	1	Pre-/co-requisite: CHEM 303
CHEM 304 Organic Chemistry II	3	CHEM 303 Recommended

Requirement Description	Credit Hours	Prerequisites
		pre-/co-requisite: CHEM 304L
CHEM 304L Organic Chemistry II Lab	1	Pre-/co-requisite: CHEM 304
CHEM 306 Quantitative Analysis and Lab	4	CHEM 112 and PHYS 151 or PHYS 211 Co-requisite: CHEM 306L
CHEM 320 Inorganic Chemistry	4	CHEM 112
CHEM 421 Quantum Chemistry and Lab	4	CHEM 112, MATH 202, PHYS 212 Co-requisite: CHEM 421L
CHEM 422 Thermodynamics & Statistical Mechanics and Lab	4	CHEM 112, MATH 202, PHYS 212 Co-requisite: CHEM 422L
IV. Electives	**12**	
Students must take two of the following three courses:		
CHEM 307 Instrumental Analysis and Lab	4	CHEM 112 and PHYS 151 or PHYS 211 Co-requisite: CHEM 307L
CHEM 350/L Biochemistry and Lab	4	BIOL 205 and CHEM 303 Co-requisite: CHEM/BIOL 350L
CHEM 370 Scientific Computing	4	CMPT 190 and PHYS 151 or PHYS 211
Students must complete an additional four credit hours of coursework from the following:		
CHEM 300 Special Topics in Chemistry	2-4	Instructor permission
CHEM 307 Instrumental Analysis and Lab	4	CHEM 112 and PHYS 151 or PHYS 211 Co-requisite: CHEM 307L
CHEM 350/L Biochemistry and Lab	4	BIOL 205 and CHEM 303 Co-requisite: CHEM/BIOL 350L
CHEM 370 Scientific Computing	4	CMPT 190 and PHYS 151 or PHYS 211
GEOL 405 Geochemistry	4	CHEM 112 or GEOL 301
CHEM 400 Advanced Topics in Chemistry	1-5	Instructor permission
CHEM 401 Directed Studies in Chemistry	1-4	Senior standing, consent of instructor and school dean
CHEM 430 Undergraduate Research	1-4	Faculty mentor permission
CHEM 440 Internship	1-2	Junior/senior standing, see course description
V. Required Courses from Other Programs	**22**	

Requirement Description	Credit Hours	Prerequisites
MATH 201 Calculus I	4	MATH 144 or placement test
MATH 202 Calculus II	4	MATH 201 or placement test
PHYS 211 Physics for Scientists and Engineers I and Lab	4	MATH 144 and co-requisite: MATH 201
PHYS 212 Physics for Scientists and Engineers II and Lab	4	PHYS 211 and co-requisite: MATH 202
WCSAM 400 Science Capstone	2	
Total Hours for the Chemistry Major	**72**	

Listed below is a suggested plan of study for completing the chemistry requirements. Students should meet with their advisors at least once a year as course offerings may change from what is listed. Students must also meet WCore and university wide requirements for graduation.

Recommended Plan of Study for Chemistry

	Fall Semester	Spring Semester
Year 1	CHEM 111 MATH 201* Learning Community	CHEM 112 MATH 202*
Year 2	CHEM 303 PHYS 211	CHEM 304 PHYS 212
Year 3	CHEM 306 CHEM 421	CHEM 422 CHEM Elective
Year 4	CHEM 320 CHEM Elective	CHEM Elective WCSAM 400

*Assumes student already has credit for MATH 144

Chemistry Minor

Requirement Description	Credit Hours	Prerequisites
I. Required Courses	**16**	
CHEM 111 Principles of Chemistry I and Lab	4	Co-requisites: CHEM 111R recommended; MATH 144 required
CHEM 112 Principles of Chemistry II and Lab	4	CHEM 111
CHEM 303 Organic Chemistry I	3	CHEM 112 Recommended pre-/co-requisite: CHEM 303L
Organic Chemistry I Lab	1	Pre-/c0-requisite: CHEM 304L
CHEM 304 Organic Chemistry II	3	CHEM 303 Pre-/co-requisite: CHEM 304L
CHEM 304L Organic Chemistry II Lab	1	Pre-/co-requisite: CHEM 304
II. Electives	8	
Complete four hours of coursework from the following:		
CHEM 300 Special Topics in Chemistry	2-4	Instructor permission

Requirement Description	Credit Hours	Prerequisites
CHEM 306 Quantitative Analysis and Lab	4	CHEM 112 and PHYS 151 or PHYS 211 Co-requisite: CHEM 306L
CHEM 307 Instrumental Analysis and Lab	4	CHEM 112 and PHYS 151 or PHYS 211 Co-requisite: CHEM 307L
CHEM 320 Inorganic Chemistry	4	CHEM 112
CHEM 350/L Biochemistry and Lab	4	BIOL 205 and CHEM 303 Co-requisite: CHEM/BIOL 350L
CHEM 370 Scientific Computing	4	CMPT 190 and either PHYS 151 or PHYS 211
CHEM 401 Directed Studies in Chemistry	1-4	Senior standing, consent of instructor and school dean
CHEM 421 Quantum Chemistry and Lab	4	CHEM 112, MATH 202, PHYS 212 Co-requisite: CHEM 421L
CHEM 422 Thermodynamics & Statistical Mechanics and Lab	4	CHEM 112, MATH 202, PHYS 212 Co-requisite: CHEM 422L
CHEM 430 Undergraduate Research	1-4	Faculty mentor permission
CHEM 440 Internship	1-4	Junior/senior standing, see course description
Complete at least four additional hours from the following:		
CHEM 306 Quantitative Analysis and Lab	4	CHEM 112 and PHYS 151 or PHYS 211 Co-requisite: CHEM 306L
CHEM 307 Instrumental Analysis and Lab	4	CHEM 112 and PHYS 151 or PHYS 211 Co-requisite: CHEM 307L
CHEM 320 Inorganic Chemistry	4	CHEM 112
CHEM 350/L Biochemistry and Lab	4	BIOL 205 and CHEM 303 Co-requisite: CHEM/BIOL 350L
CHEM 370 Scientific Computing	4	CMPT 190 and either PHYS 151 or PHYS 211
CHEM 422 Thermodynamics & Statistical Mechanics and Lab	4	CHEM 112, MATH 202, PHYS 212 Co-requisite: CHEM 422L
Total Hours for the Chemistry Minor	**24**	