CHEMISTRY, B.S.

Completion of this major program prepares one for a career as a quality control chemist, research chemist, process development chemist, forensic/toxicology scientist, or environmental scientist. Continued study may include a master's degree and doctorate in such areas of study as chemistry/biochemistry, medicine and/or dentistry, pharmacy/pharmaceutical.

There are no requirements for admission to this degree track, but students are encouraged to begin taking science and math courses as early as possible in their academic careers.

Various discipline-specific concentrations that will prepare students for multiple fields of employment or areas of additional undergraduate/graduate study are noted below. Course requirements for each concentration are explained in detail. The requirements for graduation, in addition to completion of the major area, are listed on "Undergraduate Degree Requirements (https://catalog.njcu.edu/undergraduate/undergraduate-degree-requirements/)."

Code	Title	Credits
Required Courses:		
CHEM 105	General Chemistry I Lecture	3
CHEM 1105	General Chemistry I Recitation/Laboratory	2
CHEM 106	General Chemistry II Lecture	3
CHEM 1106	General Chemistry II Recitation/Laboratory	2
CHEM 207	Organic Chemistry I	3
CHEM 2207	Organic Chemistry I Laboratory	1
CHEM 208	Organic Chemistry II	3
CHEM 2208	Organic Chemistry II Laboratory	1
CHEM 205	Analytical Chemistry Lec [1]	3
CHEM 2205	Analytical Chemistry Laboratory [1]	2
CHEM 316	Instrumental Analysis, Lecture [2]	3
CHEM 3316	Instrumental Methods of Analysis, Laboratory [2]	2
CHEM 305	Physical Chemistry I [1]	3
CHEM 306	Physical Chemistry II, Lecture	3
CHEM 3306	Physical Chemistry II Recitation/Laboratory [2]	2
CHEM 307	Biochemistry I	4
CHEM 405	Seminar [1]	1
CHEM 416	Inorganic Chemistry [2]	3
Select a minimum of two additional Chemistry elective courses or from the following list:		
CHEM 220	Environmental Chemistry	4
CHEM 308	Biochemistry II	4
CHEM 430	Spectroscopic Identification of Organic Compounds	3
CHEM 401	Medicinal Chemistry	3
CHEM 420	Food Chemistry	4
CHEM 412	Inorganic Chemistry Laboratory	2
CHEM 414	Advanced Organic Chemistry	3
CHEM 425	Nanomaterial and Microelectronic Fabrication	3
CHEM 435	Materials Chemistry	3
Required Math, Physics and Computer Science Courses		
MATH 192	Calculus and Analytic Geometry I	4
MATH 193	Calculus and Analytic Geometry II	4
MATH 311	Differential Equations for Engineers (recommended)	4
or		
MATH 292	Calculus & Analytical Geometry III	4
PHYS 140	Principles of Physics I - Lecture (or PHYS 130 College Physics I Lecture)	3
PHYS 1140	Principles of Physics I - Laboratory and recitation (or PHYS 1130 College Physics I Recitation and Lab)	1
PHYS 141	Principles of Physics II - Lecture (or PHYS 131 College Physics Lecture)	3
PHYS 1141	Principles of Physics II - Laboratory and Recitation (or PHYS 1131 College of Physics Recitation and Lab)	1
INTD 180	Computers Tools for Science and Math	3

[1] Offered in fall semester only.

[2] Offered in spring semester only.

Freshman

Semester 1		**Credits**
ENGL 101 or ESL 101	English Composition I or English Composition I for English as a Second Language Students	4 - 6
MATH 192	Calculus and Analytic Geometry I	4
CHEM 100 or CHEM 105 ***and*** CHEM 1105	Preparation for General Chemistry ((*Can test out of CHEM 100)) or General Chemistry I Lecture ***and*** General Chemistry I Recitation/Laboratory	3 - 5
General Education Tier I Course		3
	Credits	**14-18**
Semester 2		
ENGL 102 or ESL 102	English Composition II or	4 - 6
MATH 193	Calculus and Analytic Geometry II	4
CHEM 106 & CHEM 1106	General Chemistry II Lecture and General Chemistry II Recitation/Laboratory	5
General Education Tier I Course		3
	Credits	**16-18**

Sophomore

Semester 1		
CHEM 207 & CHEM 2207	Organic Chemistry I and Organic Chemistry I Laboratory	4
PHYS 130 & PHYS 1130 or PHYS 140 ***and*** PHYS 1140	College Physics I (Lecture) or Principles of Physics I - Lecture ***and*** Principles of Physics I - Laboratory and recitation	4
MATH 311 or MATH 292	Differential Equations for Engineers or Calculus & Analytical Geometry III	4

General Education Tier II Course		3
	Credits	**15**
Semester 2		
CHEM 208 & CHEM 2208	Organic Chemistry II and Organic Chemistry II Laboratory	4
PHYS 131 & PHYS 1131 or PHYS 141 ***and*** PHYS 1141	Physics II (Lecture) or Principles of Physics II - Lecture ***and*** Principles of Physics II - Laboratory and Recitation	4
INTD 180	Computers Tools for Science and Math	3
General Education Tier II Course		3
	Credits	**14**
Junior		
Semester 1		
CHEM 205 & CHEM 2205	Analytical Chemistry Lec and Analytical Chemistry Laboratory	5
CHEM 2205	Analytical Chemistry Laboratory	2
CHEM 307	Biochemistry I	4
General Education Tier II Course		3
	Credits	**14**
Semester 2		
CHEM 316 & CHEM 1316	Instrumental Analysis, Lecture and Instrumental Analysis Lab	4
CHEM 3316	Instrumental Methods of Analysis, Laboratory	2
Chemistry Elective 3XX or 4XX		4
General Education Tier II Course		3
General Education Tier II Course		3
	Credits	**16**
Senior		
Semester 1		
CHEM 305	Physical Chemistry I	3
CHEM 405	Seminar	1
Chemistry Elective 3XX or 4XX		4
General Education Tier III Course		3
General Education Tier III Course		3
	Credits	**14**
Semester 2		
CHEM 306 & CHEM 3306	Physical Chemistry II, Lecture and Physical Chemistry II Recitation/ Laboratory	5
Minor or Elective Course		3
Minor or Elective Course		3
CHEM 416	Inorganic Chemistry	3
	Credits	**14**
	Total Credits	**117-123**

*To test out of CHEM 100, students must contact the Chemistry Department. Students who take CHEM 100 are recommended CHEM 106/ CHEM 1106 in first summer session. CHEM 100 will replace an elective within their major.

Student Learning Outcomes:

Upon completion of the Chemistry program, students will be able to:

1. Identify the fundamental concepts in: general, organic, inorganic, analytical, physical and biological chemistry.
2. Quantitatively and qualitatively describe molecular behavior.
3. Design and conduct laboratory experiments, perform calculations, and interpret results to draw reasonable conclusions.
4. Demonstrate discipline-specific writing skills.
5. Use modern library searching and retrieval methods to obtain information about a topic, chemical, chemical technique.