Chemistry - Science with Chemistry Concentration

Associate in Science

Minimum of 61-66 credit hours

Do you want to research cures for cancer? Find alternative fuel and energy sources? Transform everyday materials into useful, unique products? Careers in chemistry can offer you worlds of discovery every day. At Oklahoma City Community College, you can earn an associate degree in chemistry. In this program, you’ll learn how to identify substances and how to alter their structures through chemical changes. Course topics include atomic structure, structure and bonding, electrochemistry, thermodynamics, radioactivity and synthesis. With this solid foundation, you can continue studying at a four-year college or university and then pursue opportunities in education, pharmacology, petroleum analysis, research, patent development, substance analysis, geology, medicine, nutrition and more.

Course Sequence

<table>
<thead>
<tr>
<th>Course ID</th>
<th>Course Name</th>
<th>Credits</th>
<th>Type</th>
<th>Min Gd</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suggested Freshman 1st Semester</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SCL 1001</td>
<td>SUCCESS IN COLLEGE AND LIFE</td>
<td>1</td>
<td>Life Skills</td>
<td></td>
</tr>
<tr>
<td>ENGL 1113</td>
<td>ENGLISH COMPOSITION I</td>
<td>3</td>
<td>Gen Ed</td>
<td></td>
</tr>
<tr>
<td>CHEM 1115</td>
<td>GENERAL CHEMISTRY I</td>
<td>5</td>
<td>Gen Ed</td>
<td>C</td>
</tr>
<tr>
<td>MATH 1513</td>
<td>COLLEGE ALGEBRA FOR BUSINESS, LIFE SCIENCES AND SOCIAL SCIENCES</td>
<td>OR</td>
<td>Gen Ed</td>
<td>C</td>
</tr>
<tr>
<td>MATH 1533</td>
<td>PRE CALCULUS AND ANALYTIC GEOMETRY</td>
<td>OR</td>
<td>Gen Ed</td>
<td></td>
</tr>
<tr>
<td>MATH 1613</td>
<td>TRIGONOMETRY</td>
<td>OR</td>
<td>Gen Ed</td>
<td></td>
</tr>
<tr>
<td>MATH 1743</td>
<td>CALCULUS I FOR BUSINESS, LIFE SCIENCES, AND SOCIAL SCIENCES</td>
<td>OR</td>
<td>Gen Ed</td>
<td></td>
</tr>
<tr>
<td>MATH 2013</td>
<td>INTRODUCTION TO STATISTICS</td>
<td>OR</td>
<td>Gen Ed</td>
<td></td>
</tr>
<tr>
<td>MATH 2104</td>
<td>CALCULUS AND ANALYTIC GEOMETRY I</td>
<td>3-4</td>
<td>Gen Ed</td>
<td></td>
</tr>
<tr>
<td>BIO 1124</td>
<td>GENERAL BIOLOGY I (Majors)</td>
<td>4</td>
<td>Gen Ed</td>
<td></td>
</tr>
<tr>
<td>Suggested Freshman 2nd Semester</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ENGL 1213</td>
<td>ENGLISH COMPOSITION II</td>
<td>3</td>
<td>Gen Ed</td>
<td></td>
</tr>
<tr>
<td>MATH 1613</td>
<td>TRIGONOMETRY</td>
<td>OR</td>
<td>Gen Ed</td>
<td></td>
</tr>
<tr>
<td>MATH 1743</td>
<td>CALCULUS I FOR BUSINESS, LIFE SCIENCES, AND SOCIAL SCIENCES</td>
<td>OR</td>
<td>Gen Ed</td>
<td></td>
</tr>
<tr>
<td>MATH 2013</td>
<td>INTRODUCTION TO STATISTICS</td>
<td>OR</td>
<td>Gen Ed</td>
<td></td>
</tr>
<tr>
<td>MATH 2104</td>
<td>CALCULUS AND ANALYTIC GEOMETRY I</td>
<td>OR</td>
<td>Gen Ed</td>
<td></td>
</tr>
<tr>
<td>MATH 2214</td>
<td>CALCULUS AND ANALYTIC GEOMETRY II</td>
<td>3-4</td>
<td>Gen Ed</td>
<td></td>
</tr>
<tr>
<td>CHEM 1215</td>
<td>GENERAL CHEMISTRY II</td>
<td>5</td>
<td>Major</td>
<td>C</td>
</tr>
<tr>
<td>HUM</td>
<td>HUMANITIES ELECTIVE</td>
<td>3</td>
<td>Gen Ed</td>
<td></td>
</tr>
<tr>
<td>Suggested Sophomore 1st Semester</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHEM 2114</td>
<td>ORGANIC CHEMISTRY I</td>
<td>4</td>
<td>Major</td>
<td>C</td>
</tr>
<tr>
<td>PHYS 1114</td>
<td>COLLEGE PHYSICS I</td>
<td>OR</td>
<td>Gen Ed</td>
<td></td>
</tr>
<tr>
<td>PHYS 2014</td>
<td>ENGINEERING PHYSICS I</td>
<td>4</td>
<td>Gen Ed</td>
<td></td>
</tr>
<tr>
<td>POLSC 1113</td>
<td>AMERICAN FEDERAL GOVERNMENT</td>
<td>3</td>
<td>Gen Ed</td>
<td></td>
</tr>
<tr>
<td>SOC SC</td>
<td>SOCIAL SCIENCE ELECTIVE</td>
<td>3</td>
<td>Gen Ed</td>
<td></td>
</tr>
<tr>
<td>HUM</td>
<td>HUMANITIES ELECTIVE</td>
<td>3</td>
<td>Gen Ed</td>
<td></td>
</tr>
<tr>
<td>Suggested Sophomore 2nd Semester</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HIST 1483</td>
<td>U.S. HISTORY TO THE CIVIL WAR</td>
<td>OR</td>
<td>Gen Ed</td>
<td></td>
</tr>
<tr>
<td>HIST 1493</td>
<td>U.S. HISTORY SINCE THE CIVIL WAR</td>
<td>3</td>
<td>Gen Ed</td>
<td></td>
</tr>
<tr>
<td>CHEM 2122</td>
<td>ORGANIC CHEMISTRY LABORATORY</td>
<td>2</td>
<td>Major</td>
<td>C</td>
</tr>
<tr>
<td>CHEM 2124</td>
<td>ORGANIC CHEMISTRY I</td>
<td>4</td>
<td>Major</td>
<td>C</td>
</tr>
<tr>
<td>FA SUPPORT</td>
<td>FACULTY APPROVED SUPPORT ELECTIVES</td>
<td>5-8</td>
<td>Support</td>
<td></td>
</tr>
</tbody>
</table>

Course Grouping

Major Courses: (15 credit hours) CHEM 1215 (C); CHEM 2114 (C); CHEM 2122 (C); CHEM 2124 (C)

General Education Courses: (40-42 credit hours) English: ENGL 1113, ENGL 1213; History: HIST 1483 or HIST 1493; Political Science: POLSC 1113; Chemistry: CHEM 1115 (C); Physics: PHYS 1114 or PHYS 2114; Biological Science: BIO 1124; Humanities: Six credit hours; Social Sciences: Three credit hours; Mathematics: Six to eight credit hours chosen from MATH 1513 (C), MATH 1533, MATH 1613, MATH 1743, MATH 2013, MATH 2104 or MATH 2214

Life Skills Courses: (1 credit hour) Life Skills: SCL 1001

Support Courses: (5-8 credit hours) One or two Faculty Approved Support Electives chosen from CHEM 2990; BIO; ECON; MATH or PHYS

(C) A grade of "C" or higher must be achieved.

Program Notes

Notes: This program is designed for students planning to continue their education at a four-year college or university. See the front general section for information and requirements about University Parallel/Transfer Programs.

(C) Indicates a grade of "C" or higher must be achieved.

* Math 1743 is appropriate for pre-dentistry, pre-medicine, and pre-pharmacy students only.

** Either PHYS 1214 or PHYS 2114 is strongly recommended for students pursuing careers in chemistry, medicine, dentistry, or forensic science.
BIO 1124 - GENERAL BIOLOGY I
(Majors)
Prerequisites: ENGL 0203 or adequate placement score or by meeting determined placement measures; MATH 0403 or adequate math placement test score.
4 Credits This course is the first of a two-semester sequence of organic chemistry for science and chemical engineering majors as well as students seeking to enter the fields of medicine, dentistry, pharmacy, and veterinary medicine. Students will master the fundamental concepts of structure, functional groups, and reactions of aliphatic compounds along with selected reaction mechanisms.

CHEM 1115 - GENERAL CHEMISTRY I
Prerequisites: ENGL 0203, adequate placement score, or by meeting determined placement measures; MATH 1513 or MATH 1533, or both MATH 0403 and High School Chemistry or CHEM 1123. A grade of
5 Credits This course is designed for science and engineering majors. The course covers nomenclature, atomic and molecular structure, stoichiometry, acid/base and other aqueous reactions, states of matter, phase changes, gas laws, and an introduction to thermochemistry. Laboratory experience is an integral part of the course.

CHEM 1215 - GENERAL CHEMISTRY II
Prerequisites: CHEM 1115 with a grade of “C” or better; MATH 1513 or MATH 1533 with a grade of “C” or better.
5 Credits This course is a continuation of CHEM 1115 with emphasis on thermochemistry, intermolecular forces, properties of solutions, acid/base properties, kinetics, equilibrium, thermodynamics, electrochemistry, and organic chemistry. Laboratory is an integral part of the course.

CHEM 2114 - ORGANIC CHEMISTRY I
Prerequisites: CHEM 1215 with a grade of “C” or better.
4 Credits This course is the first of a two-semester sequence of organic chemistry for science and chemical engineering majors as well as students seeking to enter the fields of medicine, dentistry, pharmacy, and veterinary medicine. Students will master the fundamental concepts of structure, functional groups, and reactions of aliphatic compounds along with selected reaction mechanisms.

CHEM 2122 - ORGANIC CHEMISTRY LABORATORY
Prerequisites: CHEM 2124 with a grade of “C” or better.
2 Credits This laboratory course is intended for science and chemical engineering majors as well as students seeking to enter the fields of medicine, dentistry, pharmacy, and veterinary medicine. Students will master common laboratory techniques used to synthesize, separate, purify, and characterize organic compounds.

CHEM 2124 - ORGANIC CHEMISTRY II
Prerequisites: CHEM 2114 with a grade of “C” or better.
4 Credits This course is the second of a two-semester sequence of organic chemistry for science and chemical engineering majors as well as students seeking to enter the fields of medicine, dentistry, pharmacy, and veterinary medicine. Students will master the concepts of structural theory, reactions, and reaction mechanisms of the principal functional groups of organic compounds which were not included in the first course.

ENGL 1113 - ENGLISH COMPOSITION I
Prerequisites: ENGL 0203, adequate placement score, or by meeting determined placement measures
3 Credits The student will write well-developed compositions which demonstrate the principles of unity, coherence, and organization and which contain specific details and vivid language. The students will locate library material and incorporate researched materials into compositions.

ENGL 1213 - ENGLISH COMPOSITION II
Prerequisites: ENGL 1103 or ENGL 1113 taken within the last year, with strong encouragement for immediate continuation.
3 Credits In this advanced writing course, students will create essays that explore and evaluate a variety of issues and perspectives suggested by fiction, poetry, drama, essays, and other types of cultural texts. Students will refine and augment the writing techniques they learned in ENGL 1113 or ENGL 1103 to develop well-reasoned, well-structured arguments in a clear, fluid, and engaging prose style.

FA SUPPORT - FACULTY APPROVED SUPPORT ELECTIVES
Prerequisites:
3 Credits Faculty approved support electives

HIST 1483 - U.S. HISTORY TO THE CIVIL WAR
Prerequisites: ENGL 0203, adequate placement score, or by meeting determined placement measures
3 Credits After analyzing events in American history from 1400 to 1870 in such areas as revolution, geographic and social mobility, political reform, government precedents and war, the student will be able to identify patterns of present day mobility, describe governmental operations in his society and help resolve conflict in society based on the students search for change, precedents, and conflict in the American past.

HIST 1493 - U.S. HISTORY SINCE THE CIVIL WAR
Prerequisites: ENGL 0203, adequate placement score, or by meeting determined placement measures
3 Credits After analyzing events in American history from 1870 to the present in such areas as political reform, industrialization, urbanization, ethnic acculturation and war, the student will be able to identify meaningful changes in his society, identify equal rights in that society, and help resolve conflict in this society based on the students search for change, equal rights and conflicts in the American past.

HUM - HUMANITIES ELECTIVE
Prerequisites:
3 Credits Humanities elective

MATH 1513 - COLLEGE ALGEBRA FOR BUSINESS, LIFE SCIENCES AND SOCIAL SCIENCES
Prerequisites: MATH 0403 or adequate math placement test score; ENGL 0203, adequate placement score, or by meeting determined placement measures
3 Credits The student will demonstrate an understanding of the general concepts of relation and function and specifically of polynomial, exponential, and logarithmic functions; the ability to solve systems of equations by utilizing matrices and determinants; and the ability to solve practical problems using algebra.

MATH 1533 - PRE CALCULUS AND ANALYTIC GEOMETRY
MATH 2214 - CALCULUS AND GEOMETRY
Prerequisites: MATH 1533 and MATH 1613 or adequate math placement test score and ENGL 0203, adequate placement score, or by meeting determined placement measures.
3 Credits
This course is intended to serve students for whom Calculus and Analytic Geometry I is a requirement. Topics will include conic sections, systems of equations (both linear and nonlinear), and a general discussion of functions with emphasis on polynomial, rational, exponential, and logarithmic functions.

4 Credits
The student will compute, interpret and apply the basic concepts of limits, derivatives, and vectors to algebraic and transcendental functions and will solve applied problems that include rates of change, optimization, analysis of graphs, and geometry.

MATH 1613 - TRIGONOMETRY
Prerequisites: Pre or Corequisite: MATH 1513 or MATH 1533 or adequate math placement test score and ENGL 0203, adequate placement score, or by meeting determined placement measures.
3 Credits
The student will evaluate trigonometric functions and their inverses, graph trigonometric functions, prove trigonometric identities, solve trigonometric equations, solve problems involving triangles and indirect measurement, use trigonometric forms of complex numbers, and identify and graph polar curves.

MATH 1743 - CALCULUS I FOR BUSINESS, LIFE SCIENCES, AND SOCIAL SCIENCES
Prerequisites: MATH 1513 or adequate math placement test score.
3 Credits
This is the first of a two-semester sequence in elementary calculus in which students use the concepts of differential and integral calculus to solve theoretical and applied problems in business, life sciences, and social sciences.

MATH 2013 - INTRODUCTION TO STATISTICS
Prerequisites: MATH 0403 or adequate math placement test score; ENGL 0203, adequate placement score, or by meeting determined placement measures.
3 Credits
This is the first of a two-semester sequence in elementary statistics in which students use the concepts of descriptive statistics, inferential statistics, hypothesis testing, and regression analysis to solve applied problems in business, life sciences, and social sciences.

MATH 2104 - CALCULUS AND ANALYTIC GEOMETRY I
Prerequisites: MATH 1533 and MATH 1613 or adequate math placement test score.
4 Credits
The student will compute, interpret and apply the basic concepts of limits, derivatives, and vectors to algebraic and transcendental functions and will solve applied problems that include rates of change, optimization, analysis of graphs, and geometry.

MATH 2214 - CALCULUS AND ANALYTIC GEOMETRY II
Prerequisites: MATH 2104 within the last year.
4 Credits
The student will use integration techniques to find antiderivatives, compute definite integrals, and solve application problems that include volume, work and pressure; investigate the convergence of improper integrals and infinite series; use Taylor polynomials and Taylor Series to approximate, represent, and analyze functions; analyze functions of three variables and their contour plots; compute partial derivatives of multivariate functions.

PHYS 2114 - COLLEGE PHYSICS I
Prerequisites: MATH 2104, adequate placement score, or by meeting determined placement measures and MATH 1513 or higher or APPM 1223, within the last two years or by evaluation. § Criteria for evaluation is in division office.
4 Credits
Students will demonstrate their understanding of useful concepts of kinematics and dynamics, energy and momentum, waves and sound, fluids and thermodynamics by (1) developing numerical and graphical descriptions of physical phenomena, (2) numerically predicting the results of physical occurrences, and (3) applying laboratory skills to analyze real situations. Numerical computations will utilize algebra and basic trigonometry where appropriate.

PHYS 2214 - ENGINEERING PHYSICS I
Prerequisites: MATH 2104 (or at least 4 hours of calculus) within the last year or by evaluation. Prerequisite or Corequisite: MATH 2104.
4 Credits
This is a physics course designed primarily for pre-engineering, chemistry and physics majors. Students will demonstrate their understanding of concepts in mechanics, heat and sound by (1) developing qualitative and quantitative descriptions of physical phenomena, and (2) predicting the results of physical occurrences based on physics theory and laboratory experiments. Quantitative descriptions and predictions will incorporate methods of calculus where appropriate.

SOC SC - SOCIAL SCIENCE ELECTIVE
Prerequisites:
3 Credits
Social Science elective

Social Science elective
Prerequisites: ENGL 0106 or adequate reading/writing assessment scores
1 Credit
Students will learn best practices for academic, career, and personal success. Students will discover their individual strengths, interests, and values to create a personalized plan; select and utilize resources that are applicable to their growth and success; and engage as active and responsible members of the academic community. This course should be taken during a student’s first semester of college work at Oklahoma City Community College and is a required course in degree plans to satisfy the Life Skills requirement.

POLSC 1113 - AMERICAN FEDERAL GOVERNMENT
Prerequisites: ENGL 0203, adequate placement score, or by meeting determined placement measures.
3 Credits
A study of the principles, structure, processes and functions of the United States federal government.

SCL 1001 - SUCCESS IN COLLEGE AND LIFE
Prerequisites: ENGL 0106 or adequate reading/writing assessment scores
1 Credit
Students will learn best practices for academic, career, and personal success. Students will discover their individual strengths, interests, and values to create a personalized plan; select and utilize resources that are applicable to their growth and success; and engage as active and responsible members of the academic community. This course should be taken during a student’s first semester of college work at Oklahoma City Community College and is a required course in degree plans to satisfy the Life Skills requirement.